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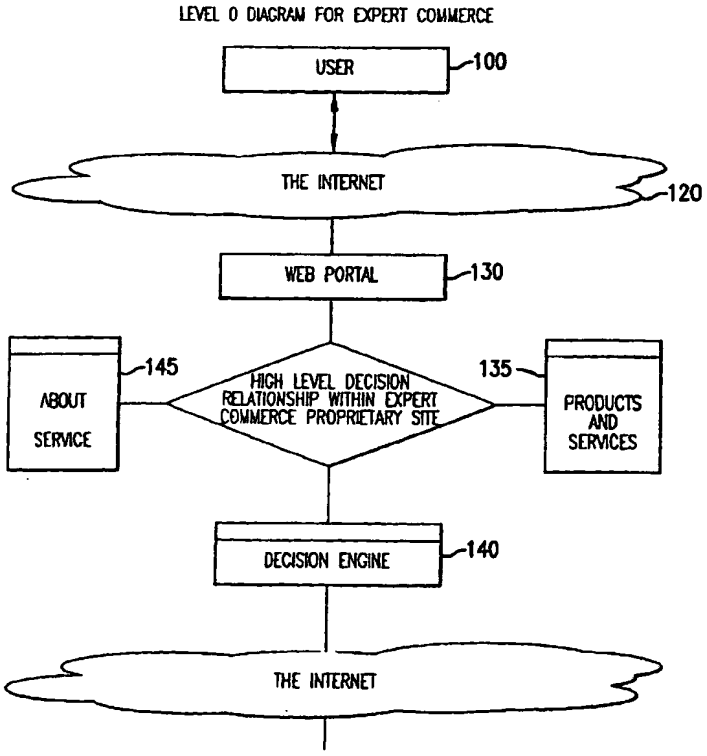

(57) Abstract: A method of assisting a user over a network (120) that enables users to evaluate various products and services (135) (collectively "products") is provided. The products are described in one or more dynamically generated data table accessible through the network. In a preferred embodiment, a user provides over the network filtering decisions that enable the system to filter product records to identify a subset of relevant products. In addition, the user preferably performs graphical pairwise comparisons of the characteristics of the desired product to indicate the relative importance of such characteristics creating a unique user profile or a user may choose a predefined profile which corresponds to their user group. The data generated as a result of the pairwise comparisons is converted into weights by applying an analytic hierarchy process to create an accurate user profile which is used to rank a set of alternatives. The system applies the profile to perform synthesis to rank the products with respect to the user's wants and needs.

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METHOD AND SYSTEM FOR NETWORK-BASED DECISION PROCESSING AND FOR MATCHING REQUESTS FOR PROPOSALS TO RESPONSES

RELATED APPLICATIONS

This application is a Continuation-In-Part application of U.S. Application No.09/396,215, filed September 15, 1999, which is incorporated herein by reference in its entirety. Also, this application claims the benefit of U.S. Provisional Application No. 60/201,526, filed May 2, 2000.

FIELD OF THE INVENTION

The present invention relates to computer methods and systems for a network-based evaluation engine.

BACKGROUND OF THE INVENTION

A wide variety of products and services (collectively referred to herein as "products") are available over the Internet and featured on-line. To make informed choices, users of the Internet need effective on-line tools to assist them in choosing or ranking products.

There are existing on-line services that assist a user in selecting a product. One such existing service is a website "personalogic.com." This service obtains two types of data from a user. First, a user identifies the types of products he/she is looking for so as to eliminate from consideration other available, but irrelevant, products. Second, the user provides input concerning the importance of several characteristics of the desired product. The user is presented with a name of each characteristic along with boxes where the user can check whether the characteristic is less important, no opinion, or more important. Based on this input, this existing service outputs a list of products, each product rated on how it meets the user's overall preferences. The list is displayed such that the most suitable products are listed first.

Existing product-selection services suffer from a variety of limitations. For example, they do not allow a user to compare various characteristics of products so as to indicate their relative importance to each other with respect to the user's preferences. Instead, the user simply considers each characteristic separately and weighs its importance in isolation. Furthermore, after the suggested choices have been proposed and presented to the user, the

user cannot dynamically redefine weights assigned to various characteristics of the products so as to reevaluate the selections. Another limitation includes the inability of the existing systems to analyze the choices made by other users whose demographics are similar to the present user so as to provide shortcuts in the decision process. Also, the existing services do not provide a substantially-natural language-query capability. Moreover, the existing systems are incapable of allowing their service and product providers to respond to user's preferences. These and various other drawbacks of the present systems make them less efficient and intuitive, and unable to sufficiently accurately capture user's preferences.

There is stand-alone software that provides a more intuitive approach to the decision-making process. See "Group Decision Support Software" User Manual, 1998 Expert Choice Inc. It, however, lacks the features that would make it adaptable for supporting a wide variety of users of an Internet-based service. For example, it does not integrate database filtering, the collection and comparison of user's profiles, substantially natural language input, as well as various other desired properties.

Thus, there is a need to provide an intuitive and flexible Internet- (or another network-) based system that would effectively assist a large number of on-line users in choosing products and services.

There is a significant body of work in the areas relating to decision processing that is useful for implementing improved decision processing systems. See, e.g., T. L. Saaty, "A Scaling Method for Priorities in Hierarchical Structures", *J. Math Psychology*, Vol. 15, pp. 234-281, 1977; P. T. Harker, and L. G. Vargas "Theory of Ratio Scale Estimation: Saaty's Analytic Hierarchy Process", *Management Science*, 33, pp. 1383-1403; F. Zahedi, "The Analytic Hierarchy Process-a Survey of the Method and Its Applications", *Interfaces*, Vol. 16, pp. 96-108 (1986); T. L. Saaty, *The Analytic Hierarchy Process*, McGraw-Hill, New York (1980); E.H. Forman, "Decision Support for Executive Decision Makers", *Information Strategy: The Executives Journal*, Vol. 1, Number 4, Summer 1985, Auerbach Publishers, Pennsauken NJ; P. T. Harker, "Alternative Modes of Questioning in the Analytic Hierarchy Process", *Math Modeling*, Vol. 9, No. 3-5, pp. 353-360, 1987, Pergamon Journals; Forman, E. H., Saaty, T. L., Selly, M. A., & Waldron, R. *Expert Choice*, Decision Support Software, McLean, VA, 1983; M. Gondran, M. Minoux, *Graphs and Algorithms*, Search for the connected component containing the vertex algorithm, pg 15, John Wiley & Sons; T. L.

Saaty, *Decision Making for Leaders*, 1995/1996 Edition, RWS Publications, Pittsburgh, PA (1985); and T. L. Saaty, *Fundamentals of Decision Making and Priority Theory*, Vol. 6, RWS Publications, Pittsburgh, PA (1994). All of the above publications are incorporated herein by reference.

SUMMARY OF THE INVENTION

A preferred embodiment of the present invention comprises an Internet portal or platform that enables users to evaluate various products described in one or more databases accessible through the portal. A stored description of a product is referred to as a "product record." The term "record" in general refers to any storage of relevant information in a database or otherwise as known in the art and is not limited to any particular storage organization or configuration. Similarly, the term "database" is not limited to a specific database or type of database and, as understood by a person skilled in the art, may refer to various types of storage such as files managed by an operating system. Preferably, the stored description of each product includes a set of characteristics of the products. (The characteristics may also be referred to as criteria, factors, and objectives, and the products may be referred to as alternatives; both products and alternatives also relate to services as well as products). Preferably, at least some of the stored characteristics of each product have already been rated by an expert in the field applicable to the products at issue. Thus, the stored data for the characteristics includes an indication of their ratings, which can be explicit or can be derived from other data as described subsequently. For example, in the case of a car, these characteristics may include price, safety, roominess, features, and performance. For these (and other) characteristics, one or more experts have preferably already provided ratings-related information that has been stored in a database in connection with each car model. For example, a high-quality car would have a high rating for the quality characteristic and an expensive car would have a low rating for the price characteristic.

Furthermore, data stored for each product preferably includes subcharacteristics for at least some of the characteristics. For example, such subcharacteristics relating to the "features" of a car may include power locks, cruise control, CD player, moon roof, etc. In general, the characteristics and subcharacteristics can be represented as a hierarchy having two or more levels. Each collection of lower level subcharacteristics belonging to the same

characteristic (at any level of hierarchy) is referred to as a "cluster." Preferably, one or more experts assign priorities to the subcharacteristics at the lowest level, and higher-level priorities are derived based on user inputs or default inputs selected by the use with his/her profile. The ratings may be derived from a utility curve that rates an absolute property of a product. The curve may, for example, provide a relationship between the actual top speed of a car and a specific rating (or score) associated with that speed.

In a preferred embodiment, a user communicating over the Internet graphically enters relative importance of product characteristics in achieving a goal. In this discussion, the terms objectives (and subobjectives), characteristics (and subcharacteristics), and criteria (and subcriteria) may refer to both actual features and a user's preferences or judgments, as will be understood by a person skilled in the art from a given context. Thus, the terms characteristics (and subcharacteristics) and criteria (and subcriteria) may cover the concept of objectives and sub-objectives as will be understood by a person skilled in the art from the context. The relative importance is preferably entered using pair-wise comparisons that are conducted with two parallel sliding bars, or a single bar with a slider that moves bi-directionally from the fulcrum, for each compared pair of the product's characteristics. The system then processes this data to determine the weights of the characteristics. The weights indicate a user's preferences; the terms "weights" and "priorities" relate to the same concept and can be used interchangeably. The user can also specify relative importance of subcharacteristics by conducting pairwise comparisons (also known as "trade-offs").

In addition, a user preferably provides filtering decisions so as to eliminate from the available alternatives clearly unacceptable products. These filtering decisions can also eliminate or add certain filtering questions or (sub)characteristics. If filtering unduly reduces available alternatives, the user is notified appropriately and preferably is provided with a capability to change the filtering choices in response.

A preferred system analyzes the relative importance of judgements corresponding to the characteristics and subcharacteristics entered by the user as pairwise comparisons (or otherwise) and assigns specific priorities to subcharacteristics and characteristics by applying a decision engine running the analytic hierarchy process (AHP). For a detailed description of the AHP see Saaty, *Decision Making For Leaders,* cited above and incorporated herein by reference. Based on the determined judgements, the system assigns priorities using the AHP

to the objectives indicating how important each objective is to the user's goal. Once priorities are calculated and rating scales have normalized the product records, a process called "synthesis" is used to assign an overall value score to each alternative so that they can be ranked. Thereafter, several top choices in order of priority are displayed to the user. In addition, the system displays how the characteristics and subcharacteristics contributed to the priority of the products by graphically illustrating the weights of the characteristics. The user can then flexibly adjust the weights of the characteristics and in response the system dynamically re-computes the priorities assigned to the products. This information and interface can be provided not only for the top choices, but also for other alternatives selected by the user.

Preferably, after the user enters pairwise comparisons, a graphical user interface supplying the user with a horizontal histogram listing characteristics or subcharacteristics is displayed, along with their current weights, rank order, and graphical slide bars to adjust the weights. Also, preferably, an inconsistency ratio indicating inconsistencies in the user's relative preferences is computed and displayed. Based on this information, the user can adjust, validate, and recalculate his/her inputs.

The preferred system has a capability of searching its database and identifying users who have previously participated in the decision-making process and whose demographic profiles are similar to the profile of the user presently engaged in the decision making process. The system runs regressions on the weights previously assigned to various characteristics by such users and then computes a sample selection of products based on these averaged weights. This technique can be employed to eliminate the need for a user's input during the selection process entirely. It can also be employed to eliminate a need to enter certain pairwise comparisons, for example, for all or some subcharacteristics. Instead of entering such comparisons, the user may select a decision profile assigned to the subcharacteristics by similar users.

Another embodiment of the present invention comprises a method of assisting a user over a network that enables users to evaluate various products. The products are described in one or more dynamically-generated data tables accessible through the network. Such a data table can be dynamically generated by products or services providers in response to the user's preferences. This and related embodiments are now discussed.

A preferred embodiment comprises enterprise software designed to function across the Internet. One version can be installed as a stand-alone system; a second version can be installed by a practitioner (for convenience, denoted often herein by "EC," for ExpertCommerce, but referring generally to anyone practicing the invention) of the subject invention on servers dedicated to the client, leased or owned by EC and managed and maintained by EC. The client receives the same functionality as if it were hosting, with the exception of the responsibility for maintenance, data storage, and upgrades, which is EC's. The latter model is known in the art as an Application Service Provider (ASP) solution.

As discussed above, a stored description of a product, alternative, or bid is referred to as a "product record." The term "record" in general refers to any storage of relevant information in a database and is not limited to any particular storage format. Similarly, the term "database" is not limited to a specific type of database and, as understood by a person skilled in the art, may refer to various types of storage, such as files managed by an operating system. The stored description of each product includes a set of characteristics of the products. Preferably, an expert has defined rating scales for any raw data in the record. Ratings are applied to the data during the application's processes. Thus, the stored data for the characteristics includes an indication of their ratings type, which can be explicit or can be derived from other data as described subsequently. For example, in the case of an RFX (RFX, as is known in the art, is a term used to refer to both RFPs (requests for proposals) and RFQs (requests for quotations)) for an electronic component, these characteristics or objectives may include business terms, product specs, and independent ratings. For these (and other) characteristics, one or more experts preferably have already provided ratings-related information, that has been stored in a database, in connection with each model. For example, a component with a high number of failures per 1000 would receive a low rating under its corresponding covering objective, which would lower the final value score for the top level objective independent ratings, while the same component may have a very short lead-time for delivery, which would translate to a relatively high score under one of the covering objectives within the top level objective business terms.

Furthermore, data stored for each product preferably includes subcharacteristics, subfactors, sub-objectives, or covering objectives for at least some of the characteristics. For example, such subcharacteristics relating to the product specs of a component may include

bus speed, power usage, calculations per second, and average running temperature. In general, the characteristics and subcharacteristics can be represented as a hierarchy having two or more levels and parent-child dependencies. Each collection of lower level subcharacteristics belonging to the same characteristic (at any level of hierarchy) is referred to as a "cluster." In one preferred embodiment, buyers assign priorities to the characteristics at any level of the hierarchy, based on what their breadth of knowledge permits them to do. The remaining top level or sub level characteristics can be prioritized by selecting a profile that has been completed by a content expert, who has completed it with respect to a particular usage or demographic grouping. An example of this is a profile for thin client terminals being made available to a purchaser who has enough knowledge to conduct tradeoffs on the top level characteristics of business terms, product specs, and independent ratings, but does not feel comfortable conducting tradeoffs between bus speed and running temperature. This buyer would load the profile in accordance with the intended use of the component in order to have the lower level judgments populated. The buyer may then create a personal profile that contains the expert's lower level judgments across all subcharacteristics, merged with the buyer's organizationally-focused upper level judgments.

A preferred system has a capability of searching its database and identifying users who have previously participated in the decision-making process and whose demographic or usage profiles are similar to the profile of the user presently engaged in the decision-making process. The system runs a regression on the weights previously assigned to various characteristics by such users, and then computes a selection of products based on these newly-calculated priorities. This method can be employed to eliminate user input during the selection process entirely. It can also be employed to eliminate entering certain pairwise comparisons, for example, for all or some subcharacteristics. Instead of entering such comparisons, the user may select profile weights assigned to the subcharacteristics by similar users. This feature can also update global profiles (those available to all users) to keep them current with the market.

In a preferred embodiment, a user communicating over the Internet graphically enters relative importance of product characteristics in selecting a particular alternative. In this discussion, the terms objectives (and sub-objectives), characteristics (and subcharacteristics), and criteria (and subcriteria) refer to the elements that a buyer is using to evaluate an

alternative, as will be understood by a person skilled in the art from a given context. Thus, the terms characteristics (and subcharacteristics) and criteria (and subcriteria) may cover the concept of objectives and sub-objectives. The relative importance is preferably entered using pairwise comparisons ("tradeoffs") that are conducted with two parallel sliding bars, or a single bar with a slider that moves bi-directionally from the fulcrum, for each compared pair of the product's characteristics. The system then processes this data to determine the weights of the characteristics. The weights indicate a user's preferences (the terms "weights" and "priorities" relate to the same concept and are used interchangeably herein).

A preferred system analyzes the judgements that correspond to the relative importance of the characteristics and subcharacteristics entered by the user as pairwise comparisons (or otherwise) and assigns specific priorities to such subcharacteristics and characteristics by applying a decision engine running an analytic hierarchy process (AHP). Again, see Saaty, Decision Making For Leaders, cited above and incorporated herein by reference, for a description of AHP, a process well-known to those skilled in the art. Based on the determined weights, the system assigns priorities, using AHP, to the objectives, indicating how important each characteristic is to a decision.

In addition, the application preferably provides filtering questions for the buyer to complete, so as to eliminate from the available alternatives clearly unacceptable products. These filtering questions can also eliminate or add other filtering questions or (sub)characteristics to the model. If filtering unduly reduces available alternatives, the user is notified appropriately and preferably is provided with a capability to change the filtering choices in response. In an RFX evaluation-and-implementation embodiment of the invention, filtering questions are not immediately run against an existing database. Instead, they are first used to generate questions that are made available to suppliers. The form containing these questions is made available via the Internet. Suppliers are notified of the RFX, preferably by email, but any other method is possible including but not limited to fax, phone call, mail, or wireless medium. Once notified, the supplier opens the RFX form via the Internet and completes the questions generated by filters, as well as the questions corresponding to lowest level subcharacteristics (known as covering objectives). Once this form is complete it becomes a product record. This record is now validated by running the SQL generated by the

filters against the supplier's answers, to verify that the supplier's alternative or bid has met the acceptable level defined by the buyer.

Once the product record is created, ratings are used to normalize the raw data in the product record. These value scores may be derived from a utility curve which rates an absolute property of a product, quantified verbal rating scales, or explicit interval step scales for non-continuous absolute data. Any scale, for example, provides a relationship between the actual top speed of a component and a specific rating (or score) associated with that speed. The result is a number between 0 and 1 that represents a value score with respect to a covering objective.

Thereafter, the software application performs synthesis to bring together the value scores and the priorities of the objectives. The result is an overall value score for each alternative. All alternatives that made it through filters are ranked and displayed to the user. In addition, the system displays how the characteristics and subcharacteristics contributed to the priority of the products by graphically illustrating the weights of the characteristics. The user can then flexibly adjust the weights of the characteristics and, in response, the system dynamically re-computes the priorities assigned to the products. This information and interface can be provided not only for the top choices, but also for other alternatives selected by the user. The effect of this dynamic sensitivity testing is a real-time re-ranking of the alternatives that allows a buyer to build confidence intervals, quantify sensitivity, play out scenarios, and justify a decision. All of these analysis or sensitivity tools provide graphical and printable outputs.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 illustrates overall architecture of a preferred embodiment.

Figs. 2-4 illustrate overall organization of web pages of a preferred service.

Fig. 5 illustrates a flowchart of software for selecting a car using a preferred service.

Fig. 6 illustrates an example of entering pairwise comparisons.

Fig. 7 illustrates a flowchart of software for administering entering demographic questions.

Fig. 8 illustrates a flowchart of software assisting a user in prioritizing the alternatives.

Fig. 9 illustrates a flowchart of software for administering pairwise comparisons.

Fig. 10 illustrates a flowchart of software for administering filtering questions.

Fig. 11 illustrates a flowchart of software for determining sample data based on demographic information.

Fig. 12 illustrates a flowchart of software for locating a user's record.

Fig. 13 illustrates a flowchart of overall software architecture controlling user interaction with a preferred service.

Figs. 14-18 illustrate output screens of a preferred embodiment, including sensitivity analysis screens.

Fig. 19 illustrates a utility curve.

Fig. 20 illustrates interactive selection of characteristics and subcharacteristics for sensitivity analysis.

Fig. 21A illustrates pairwise comparison of two characteristics.

Fig. 21B depicts a matrix that includes ratios for pairwise comparisons.

Fig. 22 illustrates computation of inconsistency.

Figs. 23 and 24 illustrate the determination of priorities of products.

Fig. 25 illustrates a utility curve.

Fig. 26 illustrates a rating scale.

Fig. 27 illustrates a feedback process.

Fig. 28 illustrates overall architecture of a second preferred embodiment.

Fig. 29 illustrates a detailed view of a second preferred embodiment.

Fig. 30 illustrates a flowchart of software for using a preferred service on a network.

Figs. 30A and 30B illustrate flowcharts of a buyer using a preferred service to make a request, and a seller's response to a request, respectively.

Fig. 31 illustrates a flowchart of software of a preferred service of the embodiment of Fig. 28.

Fig. 32 illustrates a flowchart of software for generating Request For Proposals/ Request For Quotes of the embodiment of Fig. 28.

Fig. 33 illustrates a flowchart of software for building preferences of the embodiment of Fig. 28.

Fig. 34 illustrates a flowchart of software for aggregating and manipulating supplier responses of the embodiment of Fig. 28.

Fig. 35 illustrates a flowchart of software for loading data into a decision engine of the embodiment of Fig. 28.

Fig. 36 illustrates a flowchart of software for evaluating data with a decision engine of the embodiment of Fig. 28.

Figs. 36A-D show examples of the application of steps 3603 and 3604 shown in Fig. 36.

Fig. 37 illustrates a flowchart of software for providing graphical sensitivity outputs of the embodiment of Fig. 28.

Fig. 38 illustrates architecture for administering a dynamic tree builder module over a network of the embodiment of Fig. 28.

Fig. 39 illustrates architecture for administering a trade-off module over a network of the embodiment of Fig. 28.

Fig. 40 illustrates architecture for administering a utility curve over a network of the embodiment of Fig. 28.

Fig. 41 illustrates architecture for administering a decision engine over a network of the embodiment of Fig. 28.

Figs. 42-44 illustrates architecture for administering of sensitivity graphs over a network of the embodiment of Fig. 28.

Figs. 45-55 illustrate samples of input and output screens of the embodiment of Fig. 28.

Figs. 46A, 49A. 50A, 51A, 54A, and 55A depict screens analogous to those shown in Figs. 46, 49, 50, 51, 54, and 55, respectively, but for automobile procurement instead of aircraft parts procurement.

Fig. 56 illustrates first and second preferred embodiments.

Fig. 57 shows the relationships between elements of the first and second preferred embodiments and associated figures.

Fig. 58 illustrates model relationships.

Fig. 59 depicts a model selection page.

Fig. 60 depicts a profile selection page.

Fig. 61 depicts a filters page.

Figs. 62 and 63 depict tradeoff pages.

Fig. 64 depicts a full results page.

Figs. 65 and 67 depict summary report pages.

Fig. 66 depicts a transaction report page.

Figs. 68 and 69 illustrate first and second preferred embodiments, with actor relationships.

Fig. 70 depicts a supplier response form page.

Fig. 71 depicts a head-to-head analysis page.

Fig. 72 depicts a gap analysis page.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 1 illustrates the configuration of the system of a first preferred embodiment. Users' devices illustrated as 100 communicate over the Internet 120 with the website portal of the preferred service. A user's device can be any device capable of communication over the Internet (or another applicable network) using, for example, a browser, as known in the art. Thus, such a device can be a conventional personal computer, Internet appliance, or essentially any other Internet-enabled device. In other embodiments that do not employ the Internet, such a device should have a capability to communicate over the chosen computer network, e.g., an intranet, as known in the art. The portal is symbolically illustrated as 130 and can be implemented using a server computer, as known in the art, which may range from a personal computer to a workstation or a larger computer or a network of computers. The choice of a specific computer system for the portal is based on implementation trade-offs as known in the art. The portal is preferably an Internet-enabled server, but alternatively can be another server that supports another network, e.g., an intranet. At least one database is stored at the server and administered as known in the art.

Blocks 135-145 broadly illustrate software architecture of the portal server. This software includes the decision engine 140 that provides data analysis supporting the decision making capability and implementing the AHP process. More specifically, the engine

identifies the weights allocated by the user to various characteristics and subcharacteristics of the products and then prioritizes them in accordance with the user's preferences.

Block 145 illustrates web pages as known in the art that generally guide and inform the user interacting with the portal server and block 135 illustrates application software that is executed to support the selection processes for various products (services are included in the definition of "products"). The decision engine and the application are interfaced preferably over the Internet with external sources of data and information. For example, such external sources may include databases of various products maintained by third parties, e.g., a database of restaurants and their ratings, a database of automobiles and their ratings, or a database of financial instruments and their ratings, etc. Preferably, the service uses HTML-formatted documents to interact with the users, but alternatively can employ other standards.

Fig. 2 generally illustrates the classes of preferably HTML documents available at the portal that provide general information and guidance. In this illustrative embodiment, these documents include documents relating to historical information about the company providing the service, see 201; documents generally describing the technology employed by the preferred system, see 202; preferably chronologically-indexed internal documents that are accessible by the users, e.g., press releases, see 203. The information illustrated in Fig. 2 may also include chronologically-indexed externally-generated electronic documents such as news items regarding the present service. See 204. Electronic documents featuring brief histories of corporate offices preferably including their vision statements are also stored on the server and are accessible to the users. See 205. Also included is an electronic page that has links enabling a user to access various departments or individuals of the service who interact with customers over the Internet such as human resources, investor relations, potential partners, technical support, etc. See 206.

Fig. 3 illustrates exemplary applications that may be provided by the preferred service. It should, of course, be noted that the technology discussed herein is not in any way limited to specific applications. A person skilled in the art will appreciate that the disclosed technology can enable a wide variety of on-line applications and is not limited to a specific use. As illustrated in Fig. 3, these applications include a decision tool (i.e., application) for choosing healthcare providers, see 300; a decision tool for personal investment choices, see 301; a decision tool for choosing a laptop computer, see 302; a decision tool for choosing an

institution of higher learning, see 304; a decision tool for choosing a desktop computer, see 305; a decision tool for selecting a dining out destination, see 306; a decision tool for choosing a camera, see 307; a decision tool for choosing a video recorder, see 308; a decision tool for selecting a vacation spot, see 309; and a decision tool for selecting a new car model, see 310. It is not necessary to describe in detail how each of these applications are implemented because based on the exemplary and general application designs, described in detail below, various other applications can be built. An exemplary application supporting car selection (310) is described in detail below.

As illustrated in Fig. 4, the portal includes additional information stored preferably as HTML pages that assists a user in interacting with the decision support applications (decision tools). They include electronic documents containing flow charts and descriptions of the decision processes used by the service (see 410). These documents also include alphabetically-indexed electronic documents listing current customers (see 420), as well as alphabetically-indexed documents comprising active links to the websites of partners of the preferred service (see 430). In addition, the server stores demos of how to use various applications provided through the preferred service (see 440).

Fig. 5 illustrates an exemplary application that assists a user in deciding which automobile to purchase. At 501 the user invokes this application by making an appropriate selection at a web page provided by the server and the system initiates the interaction with the user. First, at 502, it forwards to the user a page that provides an overview and explains this application. Next, at 503, the user is provided with a choice of whether to interact with a sample builder subsystem 504 that generates a sample decision based on the decisions of similar users or to proceed directly to identifying the user's own preferences. If the user decides to build a sample, control is transferred to 504. At 504, the system requests a user to enter personal information and retrieves from its database the records of users who previously made car selection choices and whose personal profiles are similar to the profile of the user at issue. To identify such similarly-situated users, the current user enters his/her demographic information and the system determines priorities consistently with choices of similar users. The user's demographic information may already be stored in the system and retrieved using identification provided by the user. Based on the profiles of similar users, the system then

presents a list of suggested car models to the user. The user may accept such a choice and exit the system.

Otherwise, control proceeds to blocks 505 and 506 where the system, using an appropriate database key, retrieves demographic questions and forwards them to the user. User's responses regarding his/her name, zip code, and gender enables the system to build a login key for the user. Alternatively, the user at this point may simply enter his/her login name because his/her demographic information has already been stored at the system. Also, as understood by a person skilled in the art, such demographic information can be determined after entering the application and before block 503.

Next, the user is prompted to filter out the alternatives in the database that are clearly unacceptable to him/her. At this point, the system retrieves an appropriate database key and based on this key the system retrieves the questions that determine the set of cars that are relevant to the user (see 507 and 508). These filtering questions may include: car body type, year and/or manufacturer that the user wants. Based on user's responses, the system removes from the consideration all the cars (alternatives) that do not meet the specified requirements. The filtering questions are preferably administered as a computerized form where the user checks response boxes as known in the art. These filtering questions may eliminate future filtering questions as irrelevant. Also, based on the answers to the filtering questions, the system may determine that certain characteristics should not be considered and certain characteristics should be added to the set of considered characteristics .

Next, the system enables the user to identify his/her preferences for the high level characteristics of the desired car. These preferences are identified using pairwise comparisons that are retrieved from the database using the appropriate key, as illustrated at 509 and 510. In this example the high-level characteristics includes (1) safety, (2) features, (3) performance, and (4) price. Of course, other characteristics (e.g., maintenance costs) may also be specified. The user graphically indicates on a pairwise basis which of these characteristics are more important and to what extent. By adjusting two parallel sliding bars, the user may compare safety to features; features to performance; and performance to price to ascertain the relative importance of these characteristics. Other pairs of characteristics may also be compared. The user interface for the pairwise comparisons is illustrated in Fig. 6. The parallel bars at the top portion of the screen are adjusted by the user to indicate relative

priorities of the characteristics. The circular chart representation is generated automatically as known in the art to reflect relative priorities identified by the position of parallel bars. The user can perform various comparisons such as safety to performance, features to price, etc., including the exhaustive set of pairwise comparisons. This illustration shows a comparison of maintenance cost to the cost of an automobile in the embodiment where the maintenance cost is one of the high level characteristics Nine dots at the right bottom part of the screen in Fig. 6 enable the user to select all such comparisons. However, in this example of four characteristics, at the minimum the user must perform at least three comparisons, such that at least one characteristic changes in each of these three comparisons. Such necessary comparisons can be chosen by selecting the dots in the diagonal column of three dots. This set of necessary comparisons is referred to as a spanning set. A user has the flexibility to select the order of entering comparisons.

After the pairwise comparisons, the user is presented with the option to conduct direct weighting to adjust any inconsistencies or errors. In other words, at this point the user can directly enter the weights indicating the relative importance of the characteristics instead of providing them implicitly through pairwise comparisons. Thereafter, at 511 the user is provided with an option to perform additional pairwise comparisons at a lower level for the subcharacteristics within each of the characteristics or to allow the system to determine and enter default data for the lower level preferences. If the default option is selected, at 512, the system checks whether the user has a profile stored in the system database that adequately describes his/her demographics. If such a profile exists, the user is prompted whether he/she wants to modify the profile; if so, the flow is transferred to 513. Similarly, if there is no stored profile with adequate demographic data, the flow is transferred to 513 where the key indicating the storage of relevant questions is retrieved. Based on this key, appropriate questions (in addition to those administered previously) are retrieved from the database and provided to the user. See 514. After the user has responded to the questions, his/her updated or new profile is stored in the database. Alternatively, if the profile exists and the user is satisfied with its content, the flow is transferred from 512 to 515. The complete profile includes extended demographic information such as user's profession, age, income level, educational level, etc. As noted, similar users can be identified based on the profile.

At 515, user's demographic information is stored and his/her profile is matched against the database of existing user profiles so as to identify the weights for lower level characteristics assigned by the users with similar demographic characteristics. Then, the weights for the characteristics assigned by the users most closely resembling the present user are averaged for each characteristic and stored (see 516).

Next, the system performs additional filtering based on the questions concerning less significant properties of the desired car. The key identifying the storage of these low level filtering questions is retrieved at 517. Based on this key, the system retrieves and forwards to the user additional filtering questions. These filtering questions may include questions covering transmission type, drive axle, and/or brake type, etc. Based on the responses, the system performs the second stage of filtering at 519 and displays the number of remaining alternatives to the user. If the user determines that there are too few remaining alternatives, the user can return to 518 and change his/her responses to the filtering questions so as to increase the universe of available alternatives.

If at step 511 the user elected to enter the low level preferences manually, the flow is transferred to 520. The system then checks for the profile of the user as discussed above and if the profile exists, the user is presented with an option to modify it. If the user does not want to modify the profile, control is transferred to 523. Otherwise, as discussed above in connection with 513 and 514, the system determines the key for the appropriate demographic questions and then retrieves such demographic questions from the database, outputs them to the user, and receives the user's input. See 521 and 522. After user's demographic information has been entered and stored as discussed above, control is transferred to 523 where the user performs pairwise comparisons to identify his/her preferences for subcharacteristics.

The comparisons for the subcharacteristics are performed using graphical tool bars as discussed above. The lower level subcharacteristics that the user compares at this point are subdivided into related sets that correspond to the high level characteristics compared previously at step 510. The comparisons at this level are performed only within the related sets corresponding to the high level characteristics. For a car, such lower level characteristics may include the sound system, safety features, interior options, output, and other features. For example, at this level the user may compare a CD player to power windows. The user

may also decide not to perform certain pairwise comparisons. In this case, the weights associated with such subcharacteristics are determined based on the demographic profile of the user as discussed above using the stored choices made by similar users. Accordingly, as indicated at 525, after each set of pairwise comparisons, the user has a choice of continuing with low level pairwise comparisons or instructing the system to load the appropriate weights determined using the demographic profile as discussed above. As illustrated, if the user chooses to perform the next set of comparisons, control returns to 523. The weights determined by performing the comparisons are stored. See 526. Also, a user has an option to perform verification adjustment of the weights after the pairwise comparisons by entering the subcharacteristic weights explicitly using a graphical tool.

After all the preferences for the low level criteria have been collected, the system identifies a database key relating to the filter administration at the lower level and retrieves the questions, administers them to the user, and collects responses. See 528 and 529. This filter administration is the same as discussed above for the lower level criteria in connection with 518 and 519. Also, as discussed above, if the number of alternatives based on the low level of filtering turns out to be insufficient, the user can change his/her filtering responses, for example, by not specifying certain choices, so as to increase the number of alternatives. Finally, at 530, the system loads data regarding the alternatives remaining under consideration after filtering and at 531 it loads all the preferences specified by the user from the record associated with the user. Next, the decision engine, which runs AHP as discussed below, is invoked to determine the weights and to apply the weights so as to determine how the alternatives match the user's preferences. See 532. Subsequently, at 534, the system saves the determined priorities and at 533 the decision engine outputs the selections for the top choices using, for example, sensitivity graphs and benefit cost ratios which can be manipulated by the user to perform "what if" scenario analysis as described subsequently. At 535 the user may choose to modify the weights and recompute the priorities of the alternatives or exit the system.

It should be noted that the products have preferably been rated by experts. In fact, each subcharacteristic (preferably at the lowest level of hierarchy) has been rated. Preferably, the ratings are established by a utility curve as illustrated in Figs. 19 and 25. The ratings assigned to the products are provided on the Y axis and the properties of the relevant

characteristic are on the X axis. Such a utility curve enables the system to capture experts' judgements and apply different scores to different properties of the product. For example, a top speed of 120 may be 30% more important than a top speed of 80, but a top speed of 160 may only be only 10% more important than a top speed of 120. Both have a difference of 40 but the return is vastly different. Such a relationship is reflected on the utility curve. Different scales and curves are preferably used for different criteria.

The preferred system utilizes utility curves as a means of developing a unique criterion ratings scale. A different specific utility curve that defines ratings is used for each rated subcharacteristic. Such a curve is derived by an expert or a group of experts and can be used dynamically. That is, the database of products may store the absolute value of the car's power and its rating would be computed dynamically based on the curve. In this implementation to introduce a new product, one does not need to assign all the ratings because some of them can be determined dynamically based on the curve. Various experts are preferably provided with group tools so as to synthesize their judgments and derive accurate data points on the curve. Preferably, utility curves reflect synthesized judgments of multiple decision makers.

Figs. 14-18 provide samples of output screens. Some of the outputs discussed below provide a user with functionality generally referred to as "sensitivity analysis." Sensitivity analysis provides a user with a capability to graphically adjust weights of the characteristics and in response, the system recomputes priorities of the alternatives and displays them in prioritized order. Computational principles relating to this functionality are discussed subsequently. In Fig. 14 horizontal bars illustrate the weights for product characteristics computed, for example, based on the pairwise comparisons. The buttons below show the prioritized car models that have been selected based on the user preferences in the order of priority. In the sensitivity analysis, the user can dynamically adjust the length of the bars so as to change the weights of the characteristics and, in response, the system recomputes the priorities and displays the alternatives in the new order of priorities based on the changed weights. Similarly, in Fig. 15 a two-dimensional graph illustrates the relationship of the weights and the priorities of the resulting selections, e.g., the cars. This output is referred to as performance sensitivity graph. The priorities for the cars and their characteristics are shown on the vertical axis, and the characteristics are indicated on the horizontal axis. Thus,

the weights for each characteristic of each car are shown. The users can dynamically change the illustrated vertical bars corresponding to the characteristics so as to change their weights and cause the system to recompute the priorities.

Fig. 16 provides a static comparison of characteristics of two alternatives. This plot is known as head-to-head comparison. For example, the screen of Fig. 16 illustrates a comparison between Volvo and Thunderbird, wherein price and maintenance are rated higher for Thunderbird and prestige and quality are rated higher for Volvo. Also, the overall score is higher for Volvo. This display can be constructed based on the derived weights and ratings of the alternatives.

Fig. 17 illustrates a dynamic sensitivity graph where the selected alternatives are displayed on the right side and the weights allocated to various characteristics by the user are illustrated on the left. As noted, the principles underlying dynamic sensitivity processing are described below. A user can dynamically change the weights on the left, and the system will recompute the priorities of the alternatives and display them on the right in prioritized order. Fig. 18 provides a plot of the computed value for a characteristic (in this example, maintenance) for the selected alternatives (in this example, cars).

It should be noted that not only can one change the weights of the highest level characteristics in the dynamic sensitivity analysis and see the effect on alternative rankings, but a user can choose to see the weights of sub-characteristics and perform sensitivity analyses on the selected node. As illustrated in Fig. 20, a user can access desired data via a single click from a node corresponding to a characteristic or subcharacteristic on a hierarchical tree representing the hierarchy of characteristics.

It should be noted that the user is not limited to generating the displays as discussed above and performing sensitivity analysis for the top choices of the products. Instead, the user is provided with a list of all the products and the user can interactively select any of the products and create graphical comparisons as described above.

Fig. 7 illustrates the process of collecting and storing demographic information. At 702 the demographic questions are retrieved from the database based on the appropriate database key. The database of the system stores different sets of questions indexed by the corresponding keys. The key supplied by an application determines the set of questions to be loaded into the interactive session with the user. At 703, the system determines whether the

set of questions corresponding to the supplied key is null. If so, this process terminates. Otherwise, flow is transferred to 704 where the questions identified by the supplied key are retrieved from the database and provided to the user.

At 705 the user enters his/her responses to the questions preferably using an electronic form as known in the art and forwards the responses to the server. Then, at 706, the system receives these responses and analyzes them, for example, to check that all the required responses have been provided and whether the entered values are within acceptable ranges. Such validation of data is known in the art. If during this validation procedure an error has been detected, control returns to 702. At this point specific deficiencies in the responses may be identified and the questions are retrieved and presented to the user again. As indicated at 707, preferably no more than five (or another selected number) such iterations to obtain satisfactory responses are permitted. If after five iterations the system still detects an unacceptable deficiency in the answers, control returns to a higher level page of the application that invoked this process.

If demographic information has been properly entered, the system determines at 709 whether this user's profile has already been stored in the system database. The system constructs a database key for the user based on user's name, zip code, and gender. This information has preferably been already entered. If this user's profile record has been found in the database, control is transferred to 710 where the profile is displayed to the user. At this point, the user has an option of modifying the existing record or creating a new record. If the profile record does not exist or the user indicated that he/she wants to create a new profile record, the system creates a new profile record for the user and stores it in the system database at a location identified by a unique key constructed as discussed above. See 712 and 713. If the user decides not to change his/her existing profile, data regarding the present decision process is added to the existing record. See 711.

Fig. 8 illustrates the process of prioritizing alternative products based on user's preferences. This process begins at 801. At this point pairwise comparisons have already been performed and the weights have been determined and stored in the record associated with the user. The weights have been derived from the pairwise comparisons as discussed subsequently. After the system has loaded from the user's record the weights, at 803, the system determines whether the price was one of the decision categories that have been

considered. If price was not one of the categories, the flow is transferred to 804. Otherwise, the flow is transferred to 805. At 804, the user is presented with a choice of whether to view a graph reflecting how his/her relative preferences could be enhanced with the increased cost. In other words, the graph shows additional benefits consistent with the user's choices that may be available at higher cost. In addition, the user can view such information as a cost-benefit table.

Otherwise, control is transferred to 805 where the system calculates and constructs dynamic sensitivity graphs. The sensitivity analysis graphs, discussed above, show the user how his/her relative preferences have been combined to prioritize the products and show the computed weights of the preferences. As discussed above, the user can view the weights allocated to the characteristics and can change the weights on the dynamic sensitivity graph by interactively dragging the portions of the graph corresponding to specific characteristics. This capability permits the user to execute various "what if" scenarios. After the user has changed the allocation of weights on the graph, the system recalculates the priorities of the alternatives based on the changed weights and displays the choices in accordance with the recomputed priorities. The system can also display to the user dynamic sensitivity graphs for the low level subcharacteristics, see 807. The second-level graphs can also be manipulated in the same fashion to show how the priorities of the alternatives would be changed if the user reallocates the weights.

At 808, the second level graph is constructed. At 809 the user can select to display the second level dynamic sensitivity graphs or quit (see 815) or continue displaying other graphs.

If the user chooses to continue with receiving graphical output, control is transferred to 816 where the user is presented with choices of such graphical displays. The user may select to build a head-to-head comparison graph, such as illustrated previously in Fig. 16. In response, the system generates such a graph and displays it at 817. Flow then proceeds to 820 where the user can exit the program or display another graphical output. If the user selects to display another output, he/she can select to construct the performance graph as illustrated in Fig. 15. See 818. In response, the system constructs such a graph and displays it. See 821. Then, as before, the user may terminate the process or request another display. Another available display is a two-dimensional plot as illustrated in Fig. 18. If the user requests this

option, the system generates the plot and displays it to the user. See 819 and 822. Then, the user can either terminate the process or continue requesting additional displays.

If at 804 the user chose an option to construct the benefit/cost table, at 810 the system loads the costs for the prioritized alternatives in the selected subset of the alternatives. The costs are preferably stored in the database of alternatives (products) of the present system or at a third party database accessible to the preferred system. Next, at 811, the system constructs the benefit/cost table by dividing the normalized benefits of the alternatives by the total cost of the alternatives. The normalized benefit is essentially the determined priority of the alternative expressed in such a way as to indicate its benefit to the user. These determined benefit/cost ratios are then stored in connection with the user's record. See 812 and 826. Thereafter, the system displays the benefit/cost table and/or graph to the user, see 813 and 814. The user can thereafter terminate the program or control is transferred to 804 and then to 805.

Fig. 9 illustrates the process of enabling a user to enter the weights of various characteristics of the desired product using pairwise comparisons ("product" includes service, as indicated above). It should be noted that although in the preferred embodiment the user allocates the weights to the characteristics using pairwise comparisons, after the weights have been computed from the pairwise comparisons the user may adjust the weights by entering the weights directly as numerical data or using graphical tools.

As illustrated in Fig. 9, the comparison process starts at 901 and at 902 the system retrieves from its database the characteristics (criteria) to be compared for a particular application. For example, as discussed in the example above relating to choosing a car, the high level characteristics may include safety features, performance, and price.

Next, at 903, the user is queried by the system whether he/she wants to perform a complete set of comparisons or only a minimum required set (referred to as a spanning set of pairwise comparisons, or just a spanning set). The full set includes all the pairs of characteristics, whereas the spanning set requires only the minimum number of comparisons that enable the system to compute the weights allocated to various characteristics. More specifically, assuming that there are four characteristics A, B, C, and D that must be assigned relative weights for the decision process, the full set of comparisons requires comparing A to B, C, and D; B to A, C, and D; C to A, B, and D; and D to A, B, and C. The minimum set

(i.e., the spanning set) on the other hand requires merely that A be compared to B, B to C, and C to D. The spanning set may, of course, include any other chains of comparisons that would enable the system to link all four characteristics together. In other words, the comparisons of B to D, A to C, and C to D are also acceptable spanning comparisons.

Based on the selection of performing full or spanning comparisons, the system displays appropriate graphical sliding bars for the pairwise comparisons as illustrated in the example of Fig. 6. It should also be noted that in some embodiments the user may provide the comparisons that supplement spanning comparisons, but fewer than the exhaustive set of comparisons; for example, the user may provide the comparisons of A to B, B to C, C to D and A to D. It is preferred that in addition to the spanning set a user enters at least one additional comparison so as to enable the system to compute an inconsistency rating of the comparisons.

After the user has entered pairwise comparisons reflecting relative preferences for the characteristics using graphical user interface (906), the results are stored as indicated at 907. The system then validates the entered pairwise comparisons. If, at 908, this validation process determines that the entered information is insufficient to perform further processing, control returns to 902. For example, user's input would be invalid if the required comparisons have not been entered. As indicated at 909, the system permits five (or another predetermined number) iterations allowing the user to enter valid pairwise data. If after the predetermined number of iterations the user still failed to enter valid data, control flow returns to the higher level application execution where the user, for example, can review an example of how to provide the comparisons. Alternatively, at this point the system may retrieve and use stored default weights for the characteristics at issue that have not been properly specified by the user so as to enable the user to continue the selection process. Such default weights are stored in the system and then retrieved as known in the art in response to user's failure to provide proper pairwise inputs.

Next, at 910, the system invokes the decision engine that runs AHP and determines the weights for various characteristics based on the pairwise comparisons specified by the user. As noted, this inconsistency rating can be determined if at least one more than the spanning set of comparisons have been performed. The system also determines the inconsistency rating for the pairwise data provided by the user. An example of an

inconsistency is when the user indicates that a characteristic A is twice more important than B, B is twice more important than C, and C is twice more important than A. Inconsistencies do not preclude the decision engine from prioritizing the alternatives in accordance with user's input. Even if a user is slightly inconsistent, he/she may still be accurately expressing his/her preferences. See Saaty, *Decision Making For Leaders* cited above and incorporated herein by reference. The inconsistency rating may be useful to alert the user that he/she may wish to reconsider the choices. The system also compares the inconsistency rating of the user with inconsistency ratings of other users stored in the database. For example, a ratio of over 10% denotes a generally high level of inconsistency that tells the user that he/she may reconsider some of the judgments entered as comparisons. A 10% inconsistency denotes that the user is 10% less consistent than a perfectly consistent set of pairwise comparisons reflecting users' judgments and 90% more consistent than a random set of comparisons which are completely inconsistent.

But, if the user believes that the pairwise input accurately represents his/her opinions, even given the inconsistency, the final decision will accurately reflect the input and no further adjustments are necessary. Inconsistency is compared to a set level (e.g., 10%) so as to alert the user, and in addition, the user is provided with the inconsistency measure computed from a pool of other users who are demographic peers of the user. This information allows the user to ensure that his/her decision is within the bounds of validity. To determine the inconsistencies of similar users, the system identifies user records of similar users based on the demographic profile of the current user and their stored records containing the inconsistency ratings are examined. The ratings of similar users are averaged (or processed in another convenient manner) to arrive at representative ratings.

The system displays the computed weights of the characteristics as well as the inconsistency rating. See 911 and 912. Note that at 911 the system explains the weights and inconsistency ratings to the user. This can be accomplished by comparing the user's input to standard results of similar users determined as discussed above. The user may choose to proceed with instructing the decision engine to prioritize the products based on the determined weights or he/she may decide to change the comparisons thereby causing the system to recompute the weights and the inconsistency ratings.

If the user rejects the resulting weights, the flow is transferred to 915 where the system provides the user with a capability of performing pairwise comparisons again or to performing certain selected pairwise comparisons or to assigning the weight to the characteristics directly. If the user decides to assign the weights directly, the flow is transferred to 916 where the user is provided with graphical tools for entering weights, such as graphical slide bars. As indicated at 917, the user adjusts such a bar chart so as to enter the weights directly. At 918, the system stores the directly-entered weights in a file and continues the processing.

The user may also decide to repeat the entire process of pairwise comparisons. In this case flow is transferred from 915 to 902 and the process is repeated as discussed above. Also, at 915, the user may decide to perform additional pairwise comparisons. In this case, at 921, the user is provided with a list of all the characteristics that can be compared at this stage and at 922 the user performs the chosen additional comparisons. Thereafter, flow is transferred to 906 where the process continues as discussed previously.

If, at 912, the user has indicated that he/she is satisfied with the weights and the associated inconsistency rating resulting from his/her selections, control is transferred to 913 where the computed weights are saved into a record associated with the user. Thereafter, this process terminates and control returns to the application that preferably continues by processing the weights so as to prioritize the products.

Fig. 10 illustrates the implementation of filtering. As discussed above, based on a key associated with a given application, the system extracts from the database filtering questions and forwards them to the user (see 1001-1003). After the user has entered the requested information, the responses are provided to the system; see 1004. The questions and responses are preferably administered using computerized forms and check boxes as known in the art. The system then verifies the entered responses (see 1005) and if the responses are invalid, flow is transferred back to 1002. Responses can be invalid if they are incomplete or unduly inconsistent. As indicated at 1006, the system allows for five (or another predetermined number) such iterations prompting the user to enter valid filtering decisions. If the user after a predetermined number of iterations still failed to provide valid data, the process terminates and control returns to the higher level of the program execution indicating failure.

If the system verified the choices as acceptable, control is transferred to 1007 where the system converts the responses to the filters applicable for filtering the database. This data is then saved in connection with the specific user. See 1008. Thereafter, the system reads the filtering responses and processes them so as to create preferably an SQL statement for filtering the database. See 1008-1010. Then, at 1011, the system searches the database and determines a subset of data that meets the filtering requirements. Also, subsequent filtering questions may be eliminated as irrelevant based on this level of filtering or additional questions may be introduced. Also, as a result of filtering product characteristics (at any level) may be eliminated from the consideration or conversely introduced into the analysis. The identified subset is then saved in a record identified with the user. See 1012. If the system also determines that as a result of filtering the subset of the remaining alternatives became too narrow or conversely that filtering did not sufficiently narrow the alternatives, additional filtering may be needed (see 1013). In this case, the system sets a flag for each of the choices that requires additional information and this loop is performed for the filtering questions identified by the flag. See 1015 and 1016. Also, the data obtained as a result of filtering questions are stored in a record identified with the user. See 1014.

Fig. 11 illustrates a sample process of identifying priorities based on user's demographic information. First, the system loads a key to locate essential demographic questions stored in the database. See 1101 and 1102. In response, the system retrieves the identified demographic questions, administers them to the user, and collects the user's responses. The system then processes the received data and builds preferably an SQL search query so as to identify users with similar demographic characteristics. See 1103-1106. Using this query, the system retrieves data concerning the persons with similar demographic properties including the weights that they have previously selected for the characteristics of the product at issue. See 1107. These weights are then applied to each characteristic separately at 1108 and saved in a temporary file associated with the user (see 1109). Alternatively, the weights can be normalized using another formula adopted by the system.

The temporary file is then formatted as input to the decision engine (see 1110) and provided to the decision engine where synthesis is performed to prioritize the alternatives based on the user's priorities computed as discussed above. The output prioritized sample choices are then displayed to the user, including the priorities corresponding to each

characteristic. See 1111. Next, at 1112, the system prompts the user whether to accept the proposed weights or to construct another sample by enabling the user to modify demographic data or priorities. If the user elects to construct another sample, this procedure repeats and, therefore, control is transferred back to 1102. If the user accepts the resulting sample weights and decisions or decides to enter his/her own choices, this procedure terminates. See 1113.

Fig. 12 illustrates the steps of locating user's demographic information in the database. First, the system receives user's identifying information, such as his/her name, zip code and gender. See 1201, 1202. Based on the identifying information, the system searches its database of existing users for the record consistent with the entered identifying information. See 1203. If such a record has not been found, this procedure terminates. See 1207. Otherwise, if there is a match, the system displays to the user his/her existing demographic information stored in the record, such as age, profession, income level, etc. The system then prompts the user to identify whether he/she is satisfied with the existing information or wants to update it. See 1204. If the user is satisfied, control flow is transferred to 1206 where this information is stored in connection with the user in association with the appropriate key. Otherwise, if the user requires an update to the demographic information, his/her profile is cleared so as to accept new information consistently with the appropriate key. See 1205.

Fig. 13 illustrates overall software architecture of typical software applications executed by the system. This architecture is applicable to the applications outlined above, including the car selection application discussed above in connection with Fig. 5. First, at 1302 the system collects user's demographic information as described above, including user's name, zip code, and gender. This data is then used to construct a database key. Based on this key, the system identifies if a record for this user has already been stored. Other demographic information may also be collected at this point. As discussed above, if user's record exists, a user may modify it or confirm that the stored information is sufficiently accurate. Next, at 1303 based on the demographic information, the system searches the database of user records to identify applicable choices that other users with similar profiles have already made. As discussed above, the system retrieves the weights associated with the existing choices of similar users and preferably averages them. (Another formula (instead of averaging) can also

be employed, as understood by a person skilled in the art). The system then computes sample decisions based on these weights.

In addition, the system has a capability to locate and retrieve user profiles and their corresponding weights in order to construct typical profiles having certain demographic properties. Accordingly, the system has a capability of storing decision weights that captures user demographic and priorities. These decisions, for example, are based on the priorities as discussed above.

Subsequently, at 1304 the user receives filtering questions for the products being selected in the particular application. Based on the user's responses to the filtering questions, a subset of the stored product information is created. It should also be noted that based on the answers to the filter questions, certain subsequent filter questions may not be delivered or certain additional ones may be added. The same holds true for the characteristics and subcharacteristics that can be ignored or added based on the filtering responses (e.g., in the car selection process if the user is only looking at sedans the criteria for towing capacity and bed length will be removed from the model). Dynamic adjustment of subsequent filter questions and considered characteristics in response to the filter questions enables the system to dynamically customize the decision process.

Alternatively, instead of filter questions where a user checks electronic boxes on the form, a text box may be presented where a user can simply type key words or phrases and the system parses and interprets the input. (This input is referred to as substantially natural language input). Then, the system determines the subset of alternatives or the filter keys and characteristic keys based on the textual input. Various known techniques for natural language and keyword queries can be employed for such an input; a preferred procedure is explained below.

Preferably, questions are delivered to the user in the form of HTML coded statements and the responses are entered into what is known in the art as a standard text box form. The user is instructed to use standard sentence structure including all punctuation but to limit sentences to standard noun, verb, subject format. A sample question could be: "Describe the type of car you would like and tell us about some of the most important features." And a sample response in the form of a sentence or a combination of phrases could be: "I like fast

Japanese cars with 6 cylinders. I don't like sun roofs but I need cruise control. It must be safe and not over $30,000."

In response, the system parses the statement and breaks it down into the following components: likes- (wants) Japanese, safety and high performance; needs- (musts) car, 6 cylinder, cruise, and under $30k; and not like- (exclude) sun roof. The system then provides feedback to the user to verify their input: "You have told us that you prefer Japanese made cars with high safety ratings and high performances. All of the cars you want to consider must have 6 cylinders, cruise control and cost less than $30k and none of the cars can have a sun roof." "If this is correct continue." "If there is more you want to tell us go to the filter interface."

After this verification of the text input interpretation, the system, in this example, does the following: determines a subset of the alternatives that consists of only the alternatives that are cars, with 6 cylinders, cruise and which cost less than $30k; and presents the user with only safety and performance characteristics to compare. All other characteristics (size, features, etc.) are removed from the evaluation; the system populates filter question data based on the user's answers from above input; and removes any characteristics that are not relevant based on the user inputs.

The system displays to the user interpretation of the text input and asks whether to proceed. A user is given the choice of viewing the ranking of alternatives based on this input (in this case the user receives decision outputs) or otherwise the system delivers additional filters to further reduce the subset of products and also delivers pairwise comparisons to develop criteria weights

Returning to Fig. 13, after filtering, the user employs pairwise comparisons to enter the weight of the product characteristics. As discussed above, the user employs a convenient graphical representations of sliding bars to input pairwise comparisons. See 1305. Subsequently, the user receives another set of filtering questions so as to further reduce the set of considered products. See 1306. If, as illustrated at 1307, the second level of filtering creates a subset of data which is inadequate, for example, too few choices remain, control returns to 1306 where the user can modify the answers to the filtering questions. The system then identifies in the database the alternatives that satisfy the filtering requirements. See 1308 and 1309. The subset of the database identified as a result of filtering is then saved in

association with the user as indicated at 1310 and 1311. Next, at 1312 the user has an option to save these results and return to the home page of the preferred service, see 1313 and 1314, or continued with the process. If the user elects not to continue, the obtained data is saved to his/her record which is tagged unfinished.

Next, additional demographic information may be obtained from the user such as his/her age, education level, income, family size, and other demographic data, and stored in the database. See 1315 and 1316. This data may already be stored in the user's record, and in this case the user can simply confirm that it is correct. Thereafter, another level of pairwise comparisons for lower level characteristics is performed. See 1317. As indicated by the loop at 1318, the user enters a pairwise comparison for each set of these subcharacteristics corresponding to high level characteristics. Subsequently, at 1319 a subset of all the alternatives that have not been eliminated by filtering is loaded from the database and at 1320 the preferences determined during the pairwise comparisons are converted into weights using the synthesis. Thereafter, at 1321 the decision engine, running AHP, processes the alternatives based on the weights and saves the priorities of the alternatives in connection with the user's record. Then, the output of the decision process is displayed to the user using various formats as discussed above. See 1323. Subsequently, the user can view different outputs or terminate the process.

A known optimization program that employs constraints can also be employed with the output of the decision process so as to develop portfolio selections from ranked alternatives. By administering additional filter questions to define constraints and subjecting the user to additional pairwise comparisons, weights can be established to extrapolate bounds. Once this is done, the data can be fed into the optimization program and a portfolio can be produced.

The following discussion describes in more detail how the system operates so as to interpret pairwise input, prioritize the products, and deliver an appropriate output including the dynamic sensitivity analysis. Fig. 21A illustrates a pairwise comparison of two characteristics (also referred to as objectives). For the pairs of comparisons, the system determines a ratio of the lengths of the entered bar as illustrated in Fig. 21A. The ratios representing pairwise comparisons are entered into a matrix as illustrated in Fig. 21B where the i,jth elements of the matrix above its main diagonal contain the pairwise comparisons in

the form of the ratio of element i to element j. As discussed previously, the user may conduct a set of pairwise comparisons for all of the objectives or the user may choose to load the results of previous pairwise comparisons to populate the upper right side of the matrix. The ratios represented in grid-filled boxes are the results of the pairwise comparisons. Whether they were completed by the user or loaded from the database is irrelevant. The ratios in the white boxes are populated by the software and are equal to one because they represent a length divided by itself. The ratios in the diagonal-patterned boxes are populated by the software. They are the reciprocals of their opposite boxes (i.e., X,Y and Y,X).

Thus, the diagonal elements of the matrix are set to 1 and the elements below the diagonal are set to the reciprocals of the elements above the diagonal. The normalized principle right eigenvector of the matrix is then computed as follows. The matrix is raised to powers until it converges, normalizing the column vectors so that they sum to one at each stage. As the matrix converges, each of the column vectors becomes the same and each element of each column vector converges to a value that represents the priority of the corresponding element being compared. When the difference between each element's value in a vector and the value in the preceding iteration is arbitrarily small (less than a predetermined value), the process terminates. Any of the column vectors can be considered and only one needs to be computed because all the vectors will be the same when the process converges.

It is not necessary to supply all of the N(N-1) elements above the diagonal of the matrix in order to compute the principle right eigenvector. As known in the art (see M. Gondran, M. Minoux, *Graphs and Algorithms, Search For The Connected Component Containing The Vertex Algorithm*, p. 15, John Wiley & Sons, incorporated herein by reference), the eigenvector can be determined if the elements were produced by a spanning set of pairwise comparisons, which, as discussed above, connects every characteristic in a given set of characteristics with every other characteristic. (The judgment set is the same as the spanning set described before). For instance, comparing A to B to C to D forms a spanning set, which is sufficient to create a direct or indirect relationship between all characteristics. Also, an algorithm discussed in Harker, *"Ratio Scale Estimation: Saaty's Analytic Hierarchy Process,"* cited above and incorporated herein by reference, can be used to compute the principle eigenvector, whereby elements in the matrix corresponding to missing data have a

value of 0, and the diagonal elements are set to 1 greater than the number of missing elements in each row (or column). Missing elements in the matrices represent the ratios of the pairwise comparisons that could be performed outside of the spanning set. For example, comparing A to C, B to D, A to D, etc.

As noted, the system also provides a measure of inconsistency so as to indicate how inconsistent the sets of pairwise comparisons are, relative to random comparisons, provided that a user conducts at least one more comparison than the required spanning set. The more comparisons are performed, the more accurate the inconsistency measure becomes because the user supplies additional information that may help to identify further inconsistencies. In other words, a user may be inconsistent on the comparison between A and D, but the system would not know that unless this comparison has been done. Once all of the pairwise comparisons have been computed and represented as priorities, AHP checks consistency of the comparisons. A high inconsistency does not invalidate a set of comparisons, it simply shows a break from conventional logic. The measure of consistency is displayed as a normalized number between 0 and 1 corresponding to the percentage as mentioned above. The closer this number is to 0, the matrix is more consistent and when the number is closer to 1, the matrix is more inconsistent. Thus, higher inconsistency is indicated by higher values. As noted, the matrix represents a set of pairwise comparisons of the characteristics (objectives) or the results of previous pairwise comparisons.

The consistency index (C.I.) is defined as: $(\lambda_{max} - n) / (n-1)$. $\lambda_{max} = SUM (PV_{1,2,n}) / N$. PV denotes the priority vector and "n" and "N" refer to the number of characteristics being compared ("N" refers to total number, "n" refers to instances). After computing λ_{max} as illustrated in Fig. 22, the consistency of the matrix is determined and the result indicates the consistency of the comparisons. Usually, the acceptable inconsistency is 10%. The random consistency index (R.I.) is a reciprocal matrix with the following average consistencies for different N random matrices:

1	2	3	4	5	6	7	8	9	10
.00	.00	.52	.89	1.11	1.25	1.35	1.40	1.45	1.49

See, Forman, Ernest H., "Random Indices for Incomplete Pairwise Comparison Matrices" *European Journal of Operations Research*, vol. 48, #1, 1990, pp. 153-155. The consistency

ratio (C.R.) is defined as: C.I. / R.I. = C.R. The C.R. is what is displayed to the user to let him/her know the inconsistency of the comparisons. If the comparisons are inconsistent, the user may choose to repeat the comparisons or may accept the inconsistency.

In discussing the prioritization of products based on priorities and ratings of the characteristics and subcharacteristics, we consider the hierarchy of characteristics and subcharacteristics (objectives and subobjectives). The priorities of the products are determined as illustrated in connection with Figs. 23 and 24. Figs. 25 and 26 illustrate utility curve and rating scale, respectively. The principle of hierarchic composition or synthesis (see Saaty, *Decision Making For Leaders* cited above and incorporated herein by reference) provides for multiplying the local weights of the subcharacteristics in a cluster by the "global" weight of the parent characteristics, thus producing global weights throughout the hierarchy of characteristics and subcharacteristics (see Fig. 24). Pairwise comparisons are conducted for all sets of characteristics and subcharacteristics selected by the user and matrices are then constructed. The decision engine derives product ratings by the ratings of childless characteristics or subcharacteristics determined, for example, using a utility curve described above.

Each column of the matrix represents a childless characteristic or subcharacteristic and each row represents an alternative using a spreadsheet format. This is called the synthesis matrix. See Fig. 24. The data points representing lowest level subcharacteristics that have data (i.e., cells in Fig. 24) are derived by locating utility scores (ratings) on the utility curves defined for each lowest level characteristic/subcharacteristic in a hierarchy. These curves, defined for each lowest level (sub)characteristic, are the absolute measurements of the performance of each characteristic of the alternatives. The scores converted using the curves are illustrated in Fig. 23. The value assigned to each rating is determined by applying a utility curve to the stored score. Such a utility curve is illustrated as Fig. 25. A utility curve, for example, provides that a score of 200 horsepower may only be slightly better than a score of 180 horsepower, but 180 horsepower can be significantly better than 160 horsepower. These curves or rating scales (see Fig. 26) are developed by experts and do not change at least for a duration of time. Each utility rating is multiplied by the weight of its corresponding subcharacteristics and then added across the columns to derive a total composite rating for an alternative. This rating represents the overall performance of the

alternative in terms of its value to the user. The alternative with the greatest composite rating is the best alternative. As noted, a typical utility curve and a standard flat ratings scale are illustrated in Figs. 25 and 26.

By providing pairwise comparisons at each level of the hierarchy, the system derives "local" weights of the characteristics and subcharacteristics. The principle of hierarchical compositions or synthesis described in Saaty, *Decision Making For Leaders* (cited above and incorporated herein by reference) is applied to multiply the weights of the subcharacteristics by the weights of their parents to derive the "global" weights. The ratings of the characteristics or subcharacteristics which have been normalized to be between 0 and 1 (where 1 is the highest possible score) for each lowest level subcharacteristic, are multiplied by the "global" weights of the characteristics and then added for all lowest level (sub)characteristics.

In the distributive synthesis, when weights are distributed in the hierarchy of characteristics and subcharacteristics, the global priority of the goal (standardized to 1.0) is distributed to the characteristics, and then to the lowest level subcharacteristics. The goal is the purpose of the decision making process, i.e., selecting a car. In one embodiment (referred to as closed system or distributive synthesis), the priorities of the lowest level subcharacteristics are distributed to the alternatives in the same fashion. Their weights are multiplied by the global weights and then all of these values are added to obtain the overall priority of the alternative.

In the ideal synthesis, instead of distributing each (sub)characteristic's priority (weight) to the alternatives, the priority is allocated to the alternatives so that the most preferred alternative under each (sub)characteristic receives the full priority of the (sub)characteristics. Each of the other alternatives receives a priority proportional to its preference relative to the most preferred alternative. The rationale for this approach is that an "ideal" alternative (an alternative having the highest possible rating) serves as a reference and receive a total priority (before normalization) of 1.0 while each of the alternatives have priorities proportionately lower. Thus, 1.0 represents a "standard," so that each real alternative receives some fraction of the "standard" depending on how well the alternative compares to the ideal regarding each characteristic. Although no alternative can receive a weight from a (sub)characteristic greater than the (sub)characteristic's weight, the sum of the

ideal alternatives' weights for a (sub)characteristic is not limited as in the closed system. If this were a closed system, then all alternative weights could only sum to 1 because each alternative weight is a proportion of that 1. In an open system, each alternative can have a weight of up to 1 because it is not being compared to a closed set of alternatives. It is being rated against a scale so that it is equal to 1* the decimal of every weighted factor (the sum of which is equal to 1).

If a new, irrelevant alternative is added (or an existing irrelevant alternative is removed), the priorities allocated to the existing alternatives under each characteristic do not change because the alternative being added (removed) is, by definition, not better than the ideal for any characteristic. Therefore, the ideal continues to receive the full priority (weight) of the respective characteristic. Furthermore, the weights allocated to the other alternatives, being proportional to the ideal, would not change either. However, the alternative being added (removed) would receive (relinquish) a priority in proportion to its weight against the ideal alternative. This means that in the distributive mode (closed system), alternatives give away weight to a new alternative that is added to a set because all of them have to sum to 1. This weight could come from any alternative and can differ from characteristic to characteristic. This can cause all ranks to change. In the "ideal" approach, one alternative gets the highest score so that when the subset of alternatives is normalized, the ideal alternative permits a new alternative to be added without all other alternatives giving away weight to it, so that none in the original set change rank. After the alternatives receive a priority from each of the lowest level (sub)characteristics, a subsequent normalization is performed so that the sum of the alternative priorities is 1.0.

The sensitivity analysis plots illustrated above are used to investigate the changes in the priorities of the alternatives when the weights of characteristics at a given level of the hierarchy are changed. As noted, "characteristics" or "criteria" may also be referred to as "objectives" and therefore in this discussion "objectives" are synonymous with "characteristics." Also, instead of discussing characteristics and subcharacteristics, we refer here to a hierarchy, as known in the art, of objectives. Thus, objectives form clusters that belong to a hierarchy and have a parent objective. As discussed previously, this is the same as characteristics and related subcharacteristics in a hierarchy. In the general case it is possible to have several levels of such clusters of objectives.

As noted, the sensitivity analysis is performed to investigate the changes in alternative priorities as the weights of the objectives change. It is possible to vary weights of objectives anywhere in the hierarchy, in which case a user can look at how the priorities of the alternatives vary with respect to either the parent of the cluster for which priorities (weights) are being changed, or with respect to the goal of the comparison. (The goal is the purpose of the decision making process, for example, in selecting a car application, the goal is to find the car).

One approach to sensitivity analysis is known as gradient sensitivity. Consider the priorities of the alternatives with respect to the goal, given the weights of the objectives, derived from the pairwise comparisons (or otherwise), as a vector (call this vector 0), the i^{th} component of which represents the priority of alternative i. A separate gradient sensitivity plot consisting of one line for each alternative (i = 1, 2, ... n) can be produced for each objective (j = 1, 2, ... m) in the cluster of objectives being considered.

Consider increasing the weight of one of the objectives, call it j, in the cluster below the goal, and simultaneously decreasing the weight of the other objectives in proportion, such that (1) the ratios of the weights of the other objectives to one another remains the same, and (2) the total weight equals 1. In the limiting case when the weight of objective j is increased to 1, the weights of the other objectives will become zero. The priorities of the alternatives in this limiting case can be computed as the priorities of the alternatives relative to the j^{th} weight, which is now 1. These weights can also be put in a vector (call this vector j). Since the synthesized weights for the objectives (j) and the alternatives (i) are linearly related, these two vectors (i and j) can be used to plot straight lines, one line for each alternative, on axes where the y axis represents the alternatives' priorities and the x axis represents the weights of the objective being varied (objective j). For example, two defining points for the line corresponding to alternative i are (1) the point representing the priority of the alternative i given the original weights of the objectives (the y value from the i^{th} element of vector 0 described above, and the x value, the weight of the j^{th} objective, and (2) the point representing the priority of the i^{th} alternative relative to the j^{th} objective (the y value from the i^{th} element of the j^{th} priority vector, and the x value equal to 1). The lines are extended to the x axis where the height of each line represents the alternatives' priorities when the j^{th} objective's weight is decreased to 0. A gradient sensitivity plot consisting of n alternative lines is produced for

each of the m objectives in the cluster of objectives being considered. In this case, the cluster is usually formed with top level characteristics (objectives). But, it can also include both characteristics and subcharacteristics.

The sensitivity plots are a function of the vectors available from the ideal or distributive synthesis processes described above as understood by a person skilled in the art. They differ in how much information is displayed and the way the information is displayed. Dynamic and performance sensitivity plots (see, e.g., Figs. 14 and 15) are constructed using the same linear relationships as the Gradient sensitivity, with different graphical representations. The two-dimensional performance-sensitivity plot is a subset of the full performance sensitivity plot, plotting alternative priorities as a function of any two of the m objectives at a time. A difference (head-to-head) sensitivity plot depicts the priorities for each of two alternatives with respect to each of the m objectives.

By applying a process called feedback to an existing decision regarding the preferred products, instead of showing how alternatives performed with respect to the characteristics and subcharacteristics, the system can show how important characteristics or subcharacteristics are with respect to selected alternatives. Thus, a user can use the alternatives to study which characteristics or subcharacteristics are usually important to the decision and then streamline the selection process. For example, if a user previously thought that price was very important in his/her decision making model, to test the validity of this view, he/she may consider top alternatives and apply the feedback process with respect to the top-level characteristics. For example, if all top alternatives have similar price, then price may become less important in the selection. The feedback process enables the user to compare any level of characteristics with respect to alternatives and to derive new weights for the top level characteristics. These new weights are then aggregated with the original weights of the top level characteristics in a supermatrix as discussed below. The result is a more accurate decision due to the use of more informed weights for the characteristics.

To implement this process, the resultant matrices reflecting the comparisons as discussed above are transformed into a supermatrix which contains the ratios for all characteristics and alternatives. (The process of creating a supermatrix is known in the art and explained in Saaty, *Decision Making With Dependence: The Analytic Network Process*; RWS Publications, Pittsburgh, PA 1996, incorporated herein by reference). Priority vectors

are calculated, as known in the art, and the sensitivity of characteristics with respect to alternatives can be displayed in the form of a sensitivity plot.

Fig. 27 illustrates a feedback process that can be employed by this system. As illustrated at 2701, the decision process outputs prioritized alternatives to the user. Next, at 2702, the user may consider specific characteristics (objectives), at high or low levels, in connection with a given alternative. If a user decides to do so, the processing continues; otherwise, it terminates. If the processing continues, the system enables the user to choose a specific alternative and then the system displays the objectives compared with respect to their importance for the alternative. See 2703 and 2704. Thereafter, the user enters new relative importance for the objectives and provides the resultant input to the feedback process. See, e.g., *Decision Making With Dependents: The Analytic Network Process* referenced above and incorporated herein by reference. The pairwise comparisons performed on the objectives are used to derive priorities for them which are then fed into a supermatrix in the cells corresponding to the alternatives and the objectives. The matrix is then processed as discussed in the above publication. See 2705. As a result the system outputs the decision data to the decision engine that subsequently provides the decision output to the user with a new prioritization of alternatives. See 2706 and 2707. Then, the user may again choose an alternative and reevaluate the objectives.

Figs. 28-44 illustrate the system of a second preferred embodiment. Fig. 28 generally depicts a plurality of buyer devices 2801 and a plurality of seller devices 2802 which can communicate over the Internet 2803 with a net market 2804 (also referred to herein as a net market maker, or NMM, discussed in more detail below) (*e.g.*, an Internet portal service). The net market 2804 can be an aggregation site, vertical market, single product market, multi-product market, single supplier market, buyer hosted market or any other platform which aggregates and facilitates commerce. The commerce can be conducted in the form of a traditional auction, reverse auction, Dutch auction, dynamic exchange or virtually any other form. The buyer or seller device can be any device capable of communication over the Internet (or another applicable network) using, for example, a browser, as known in the art. Thus, such a device can be a conventional personal computer, Internet appliance, Internet-enabled wireless phone or essentially any other Internet-enabled device. In other embodiments that do not employ the Internet, such a device should have a capability to

communicate over the chosen computer network, e.g., an intranet, as known in the art. The net market 2804 can be implemented using a server computer, as known in the art, which may range from a personal computer to a workstation or a larger computer or a network of computers. The choice of a specific computer system for the net market 2804 is based on implementation trade-offs as known in the art. The net market 2804 preferably utilizes an Internet-enabled server, but alternatively can use another server that supports another network, e.g., an intranet. Also preferably, at least one database is stored at the server and administered as known in the art. Preferably, a plurality of databases are in data communication with the net market for storing and retrieving information related to user preferences such as hierarchies, product characteristics, transactional information, aggregated data or the like.

The net market 2804 has a software architecture that includes a network-based evaluation module 2805 for dynamically generating requests for proposals ("RFPs") or requests for quotes ("RFQs") and matching RFPs/RFQs to responses. The evaluation module 2805 may also be referred to herein as a decision guide, a decision engine, a purchase evaluation engine, or a dynamic matching engine. This module provides data analysis supporting decision making capability and includes the AHP process, as described previously. More specifically, the evaluation module identifies the weights allocated by a user, such as a buyer, to various characteristics and subcharacteristics of desired products and then prioritizes them in accordance with the user's preferences and then provides responses including product information which preferably match those preferences.

Referring now to Fig. 29, a general illustration of the software architecture is shown with the evaluation module 2805 in communication with the net market 2804 and the net market 2804 in communication with the Internet 2803. This view delineates the actions preferably performed by the net market 2804 and those actions preferably performed by the evaluation module 2805. For example, the net market 2804 preferably performs the validation of supplier eligibility, notifies and delivers the RFP/RFQ to the supplier, collects third party data, processes, validates and aggregates supplier responses and third party data, and notifies the successful supplier. The evaluation module preferably generates the RFP/RFQ, builds preferences using trade-offs or pairwise comparisons, creates a profile using a decision engine and compares the profile to data delivered by the net market using

AHP, provides sensitivity graphs for interactively selecting and ranking responses to the RFP/RFQ, and outputs a value based ranking of the responses.

Fig. 30 illustrates a part block diagram and a part flow diagram of a preferred method of matching RFQs or RFPs to responses. First, at 3001, an RFP/RFQ form is loaded and generated. Preferably, a user, such as the buyer, responds to that module so that it can be determined what the user cares to buy and/or evaluate. Next, at 3002, a graphically adjustable bar for performing pairwise comparison, as previously described, is preferably delivered to the user and the user may adjust the bar according to the user's preference to create a profile and a RFP/RFQ. At 3003, the user's preferences or profile are sent out to the net market 2804 and the net market searches for eligible sellers or suppliers and eligible suppliers are validated. Next, at 3004 the net market 2804 notifies the eligible supplier of the user's RFP/RFQ and the supplier can respond to the RFP/RFQ and the net market 2804 collects responses and/or data from the suppliers relevant to the desired product or RFP/RFQ to create a dynamically generated data table. At 3005, the net market may supplement the data table from other sources, such as third parties or other existing databases, such as product catalogs or the like to obtain a more extensive pool of data. Next, at 3006 the net market may verify that responses have been made to all the required fields and that a sufficient amount of data has been collected. Next, the data table is forwarded to the evaluation module 2805 where it is aggregated and manipulated at 3007 and preferably formatted to be loaded into a decision engine running AHP at 3008. Preferably the formatting can be done using SQL scripts, however any other suitable technique may be used. Preferably, different scripts are used for each distinct implementation to properly format the data. Next at 3009, the decision engine running AHP applies a utility curve or rating scale, as previously described, to the data supplied by the net market to transform the supplied data. The profile created at 3002 is opened and the preferences weights are calculated using AHP. The transformed data is compared with the weighted preferences to prioritize the alternatives based on the averaged weights computed, as discussed above, to produce value-based rankings. The output prioritized sample choices or rankings are then displayed to the user, including the averaged weights for the characteristics. At 3010(a), the output is preferably captured and saved for later analysis, such as aggregate analysis based on user demographics. At 3010(b), different sensitivity tools, as previously described, are delivered to the user for analyzing the data. At

3011, the values or rankings of the bids or responses are transmitted to the net market to be forwarded to the user and at 3012, the net market notifies the user or buyer of the bids and ranking and the user can interact with the tools or sensitivity outputs. The final step, at 3013, is the selection of a response that matches the RFP/RFQ or the buy transaction. A person skilled in the art will appreciate that steps performed by the net market, as described above, may also be performed by the evaluation module.

Figs. 30A and 30B illustrate a general overview of flow charts of the process, starting with a buyer making a request in Fig. 30A and a seller's response to that request in Fig. 30B. In Fig. 30A a buyer makes a request by first logging on to a net market at 3020 and chooses whether or not to use the evaluation module dynamic matching engine. If the buyer uses the evaluation module dynamic matching engine, the buyer enters information into the application server 3022 required by the net market as well as information required to perform the AHP process and create a preference profile to generate an RFP/RFQ. The preference profile is then sent to the net market database 3024 and to an evaluation engine dynamic matching engine database 3023 and the net market informs the seller of the RFP/RFQ. If the buyer chooses not to use the evaluation module dynamic matching engine, all of the buyer's information is forwarded to the net market database 3024 and an RFP/RFQ is forwarded to a seller.

Fig. 30B shows generally a flow chart of a seller's response to a buyer's RFP/RFQ. First a seller responds by logging into a net market at 3020 and supplies the required information to the application server 3022 for the net market and for the evaluation module dynamic matching engine. Information needed by the evaluation module dynamic matching engine is transferred to the evaluation module dynamic matching engine database 3023 and a ranked list of alternatives is returned to the net market application servers 3022 and the buyer may be informed that all responses have been entered or that bidding is closed. Thereafter the buyer may view the ranked list of alternatives on the net market web server 3021 and perform dynamic sensitivity analysis to reach a final decision or match the RFP/RFQ with the responses. The net market is then informed of the buyer decision and the net market can notify the seller of the buyer's decision.

Fig. 31 illustrates the steps which are preferably performed by the evaluation module in more detail. At 3103, a hierarchy database is used to store information relating to the

criteria node tree. At 3104, a profile database stores the user created profiles. At 3105, a transactional database is used to store data from the ongoing or current or live transaction. For example, as the user dynamically alters the preferences using the sensitivity tools, the alternatives and their rankings are dynamically altered, and the transactional database stores this dynamic information as the transaction is ongoing.

Fig. 32 illustrates the RFP/RFQ generator process of Fig. 31. First, at 3201 a user logs on to the evaluation module using a unique log-on signature as known in the art. The log-on signature can be assigned via membership in the net market 2804, assigned from other users, such as suppliers, established specifically for a single application, harvested from any third-party source, or created by the user. Capture of the log-on signature may done via direct input into an HTML screen hosted by the net market 2804, read from a file saved locally on the user's system, or can be captured using any other means common in the art.

Next, at 3202, the user's log-on signature is validated by preferably matching the signature with a stored list of valid strings. If there is a successful match, preferably access is allowed to a profile of the user's constraints, requirements, and preferences which are preferably previously stored. A failure to match the log-on signature will prompt a routine to build a profile of the user's constraints, requirements, and preferences. Next, at 3203, information that is stored and associated with the log-on, such as a list of all the goods and services offered by the net market and qualified to the user will be presented to the user to facilitate the selection of a good or service to be evaluated or acquired. At 3204, a form having questions may be delivered to the user for the purpose of collecting the user's requirements and constraints which can be used for filtering, as described above. The responses to the questions can be in plain language and the user's requirements or constraints can be parsed out of those plain language responses. Also, the form may be static or dynamically mapped to a series of requests for information which will populate a table, such as a hierarchy, for evaluation. The requests can be either subjective or objective.

The hierarchy mapped to the form is preferably sufficiently inclusive of criteria to encompass all criteria necessary to evaluate the desired product or that the user deems as substantial. The selection of criteria translates to maintaining a node active rather than adding nodes to the hierarchical tree. Those criteria not selected by the user cause the corresponding nodes to be inactivated. Preferably, the hierarchy allows for dynamic

hierarchical tree building so that users may select from a pre-defined set of criteria to build a unique and valid hierarchy. In this way, a user can select from a pool of data points to create objectives which act as categories in which data points can be grouped and the data is mapped to formulas or ratings scales which transform the data into a comparable format. Also, the questions and responses to the filtering and criteria questions can be dynamically linked to subsequent questions that are dependent upon the prior responses. Next, at 3205, responses to the form are verified to assure that required responses have been completed, and if required responses are not present, the form may be returned to the user for completion. At 3206, the validated form is parsed and the requirements and constraints are preferably separated from criteria which are entered into the decision engine.

Next at 3208-3212, a hierarchy may be built by applying pre-existing maps corresponding to the criteria. This hierarchy is preferably then read into a table to construct data-grids and deliver pairwise comparisons or trade-offs and to be analyzed by the decision engine. At 3208, lower level subjective and objective questions may also be included to complete the hierarchy. If so, they are also preferably mapped to the corresponding criteria. At 3210, using the completed hierarchy a data grid may be constructed for delivery to suppliers or buyers respectively, through an intermediary such as the net market for distribution or notification to users. Also, at 3212, the hierarchy and data-grid may be stored in a database.

Referring to Fig. 33, a preferred method of building preferences for a hierarchy is shown. The preferences are preferably built using trade-offs or pairwise comparisons, as previously described. First, at 3301, a preference table is loaded from the product hierarchy database 3103, and at 3302 the database 3103 is queried based on previous log-in information; preferably saved, stored, or pre-loaded preference profiles are available. At 3303, a specified default preference may be generated based on business rules associated with the user's log-in. At 3304, the user is preferably able to choose to accept the default profile or load a preference profile from the previously queried profiles. Also, the user can choose to regenerate or make another profile. At 3305, based upon the user response the default profile is replaced with a user-selected profile, or the default profile can be left active. At 3306, the user can adjust the preferences using pairwise comparisons or the trade-off module (shown in

Fig. 38). After the desired preference trade-offs have been determined, at 3308 the user may store the results as a new profile and the results may be loaded into the profile database 3309.

Referring to Fig. 34, a preferred method to aggregate and manipulate supplier responses is shown. First, at 3401 data is provided to the net market 2804 or market aggregator, however the present invention is not limited by the data source. The data preferably consists of product information, such as XML spec sheets, supplier housed catalogs, net market housed catalogs, supplier completed forms, third party housed catalogue data, screen scrapings of any web site, completed forms from third party sources, buyer completed subjective ratings, or data supplied from any other source. At 3402, the data is read into a working database for manipulation and aggregation. At 3403, filters, such as scripts or any other agents, are applied to the data to order and format the data into a predetermined layout.

Next, at 3404 maps and/or conversion algorithms are applied to the data to transform non-numeric data fields into real numbers and at 3405 the data is formatted, for example by applying formulas to the data, for input into the decision engine running AHP. The formatted input file is preferably saved into the transactional database.

Fig. 35 depicts a preferred method of loading the data-grid into the evaluation engine. First, at 3501 the formatted input file is opened. At 3502, the questions designated to be filtered by the user are parsed out and a table is created containing the parsed-out filter questions at 3503. An empty data-grid is preferably created at 3504 from the remaining, non-parsed out information in the input file and at 3505 the data-grid and filter file are preferably saved into the transactional data base.

Fig. 36 is a diagrammatic representation of the AHP decision engine process. First, at 3601 the data-grid saved in the transactional data base is opened and the format and field types are validated. At 3602, the data-grid is loaded into a table specified for evaluation by the AHP evaluation engine. Next, at 3603 utility curves, rating scales, step scales, and direct weights are applied to cells in the data-grid. See AHP evaluation sub-process (shown in Fig. 39). At 3604, the profile and mapped hierarchy saved in the profile database is opened and the preference weights are calculated using the AHP evaluation sub-process (shown in Fig. 40). Next, at 3605 a table is created that contains alternatives with their AHP-assigned

rankings and corresponding scores and at 3606 the table is saved, with the ranked alternatives, along with the associated data, into the transactional database.

Figs. 36A-C show examples of the steps of 3603 and 3604 in more detail. In Fig. 36A, the covering objectives or characteristics are shown in a row along the top of the table and the alternatives, corresponding to for example various sellers' products, are shown in a column along the left hand side of the table. In Figs. 36A and 36B, various types of utility curves are shown in the second row of the table for display purposes only to demonstrate the types of curves that may correspond to the objective of that column. In Fig. 36A, the table is populated by various raw scores for each alternative that corresponds to each objective. In Fig. 36B, each raw score is transformed according to the utility curve associated with the correlated objective of that column into an alternate value score. In Fig. 36C, the global priority of each objective is determined by the AHP process (discussed above) and multiplied by each alternate value score for each objective and the summation of these multiplied values for each alternative yields a total score for each alternative. For illustration purposes only, global priority numbers have been inserted for the various covering objectives. As previously described, the sum of the global priorities for all of the objectives equals one.

Fig. 37 shows a preferred graphical sensitivity output method for use in this embodiment so that the user can dynamically alter the user preferences and simultaneously view the results. First, at 3701 the table containing ranked alternatives is opened. This table is preferably displayed to the user and reflects the results of the evaluation. The table is preferably populated with information from the AHP-ranked table discussed previously. The layout may be custom designed for each application. Next, at 3702 the user may choose the alternatives to include in the final evaluation by selecting them. At 3703-3707, the user can select a dynamic graph tool to evaluate the results based upon the chosen alternatives. As previously discussed, the user can choose from a dynamic sensitivity graph tool at 3704, a dynamic gap graph tool at 3705, a head-to-head tool at 3706, or a custom output tool at 3707 that can be designed specifically for each application. At 3708, the weights can be altered or updated and the results can be saved in the transactional database. The user may save, update, or rework the profile as desired. Upon a save request, the profile database is also updated.

Sensitivity analysis of a subset of alternatives may also be performed by the user. Selections of those alternatives are preferably fed into a sub-process dynamic sensitivity (shown in Fig. 41). Next, the subset of alternatives selected by the user are preferably fed into the sub-process dynamic performance (shown in Fig. 42) and then into the sub-process head to head (shown in Fig. 43). The custom outputs can be delivered and populated with data from the alternative subset.

Referring to Figs. 38-42, process sub-module diagrams are shown. Fig. 38 shows a preferred dynamic tree building module which is a part of the method shown in Fig. 32. First a form is delivered to the user's local system for the user to complete. Preferably, the module is developed by a content expert and the content of the form has mapped links to the hierarchy. Also preferably, the form is configured as an applet written in the Java programming language; however, other configurations may be used. The applet is preferably in communication with a hierarchy database and a dynamically-generated data table. The mapping and business rules are contained in the hierarchy database and data used for validation is housed in the dynamically-generated data table. The module preferably captures the user's responses the form. The business rules are applied to validate that the user responses have resulted and that both adequate filter questions and a navigable hierarchy with appropriate data points is linked to them.

Referring to Fig. 39, a preferred trade-offs module is shown for this embodiment. Preferably the module is configured and performed in the form of a Java applet delivered to the user's local system, allowing the user to perform trade-offs or pairwise comparisons of any node of the hierarchical tree. The module preferably contains modified programming code that loads objectives into the trade-offs module navigation tree and calculates inconsistency, as described above. Also, the calculated inconsistency values can be compared to a pool of demographically-similar users so as to provide a more accurate comparison upon which the user can decide whether or not to proceed with certain inconsistency values and to ensure that the inconsistency is within the bounds of validity. Inconsistency thresholds can be set based upon the components of each unique decision hierarchy. Also, business rules are applied to validate that the user responses have completed the necessary number of trade-offs or comparisons, and if not the user is given the choice to either load a profile or continue to perform trade-offs or pairwise comparisons. After the trade-offs are complete, the decision

engine running AHP is applied to derive and assign preference weights, as previously described. The user is then given a choice, for example via a standard html web page, to save his/her preferences or save them as a profile to be used later and applied to similar decisions in the future.

Referring to Fig. 40, a preferred utility curve application is shown. The application is delivered to a user's local system and allows the user to administer the utility curves. The user can set and apply utility curves or ratings scales to adjust the application of the curves. For example, the user can set minimum and maximum values, slope, or ranges for step scale. The minimum and maximum values can be used to update the utility curves based upon the intervals chosen to create a final ranking for the interval applied to the product data supplied by the net market. In this way, a more focused evaluation can be performed, depending upon the criteria and utility curve that is applied. Also preferably, the utility curve application can be self-adjusted for a set of data points so that a user does not have to administer to the utility curve.

Furthermore, if the user is an expert, the utility curve application can allow the expert to build utility curves or ratings scales or step functions. Using this application, an expert user, such as an engineer, can create a utility curve by rating a product or characteristic based upon his/her expertise. As previously, described, the ratings assigned to the products are provided on the Y axis and the properties of the relevant characteristic on the X axis to create the utility curve. Such a utility curve enables the system to capture the expert's judgements and apply different scores to different properties of the product. The utility application is preferably written in the form of a java applet and delivered to the expert user's local system; however, any other suitable programming language may be used. The module is capable of reading in data and capturing data dynamically in a data table or aggregated file in the hierarchy database so that a utility curve can be dynamically created, altered or updated. In this way, a plurality of expert ratings can be combined, for example, using AHP to synthesize the judgments, to yield a utility curve reflective of numerous expert ratings. The user or participant can apply any scale and may assess a predefined ratings scale so as to have it reflect his/her explicit judgments. An internal module of the application preferably reads the data input feeds and sets the min and max of continuous data utility curves to represent the actual data while holding the slope of the formula constant.

Referring to Fig. 41, a diagram of a preferred evaluation ranking engine is shown. First, an applet, preferably written in the Java programming language, is delivered to the user, preferably via HTML so that the user may view the ranked alternatives and select a subset to evaluate with graphical tools. Ranking is done as previously described by performing a combined synthesis of the AHP generated preference weights and the converted and normalized data scores. Next, a user may select a sub-set of alternatives loaded into the transactional database to be used in graphical outputs to further evaluate the rankings.

Referring to Figs. 42-44, views of the preferred graphical analysis tools used in the present invention are shown generally. These figures show each different graph as being linked to a dynamically generated data table. Figs. 42 and 43 illustrate a preferred method of adjustment of dynamic sensitivity graphs. First, an applet is preferably delivered to the local system of the user containing a dynamic sensitivity graph or a dynamic gap analysis graph, as discussed above. A graph builder module preferably loads a sub-set of selected alternatives and allows the user to perform a dynamic sensitivity adjustment with respect to any node of the hierarchy. Also preferably, the user can simultaneously view components and the results, as well as revert and/or save. Preferably, a sub-module is programmed to allow the user to perform sensitivity adjustment to the selected sub-nodes as well. The user can save the adjusted profile as a separate profile or update other profiles.

Referring to Fig. 44, a preferred method of performing static head-to-head graph analysis is shown. An applet is delivered to the local system of the user containing the head-to-head graph as previously described. A graph builder module is preferably loaded with a subset of selected alternatives and allows the user to select which alternatives to view with respect to any node of the hierarchy. The user can view components, revert, or save. The user can save the adjusted profile as a separate profile or update previously-saved profiles. Also, a configurator application can be integrated into the evaluation module so that if a sufficient match is not obtained, the configurator application can construct a purchasing profile and select a product using the resulting profile so that the product can be customized to the profile.

Figs. 45-55 provide samples of input and output screens for the second preferred embodiment shown, for example, implemented in the procurement of aircraft parts. Figs. 46A, 49A. 50A, 51A, 54A, and 55A depict screens analogous to those shown in Figs. 46, 49,

50, 51, 54, and 55, respectively, but for automobile procurement instead of aircraft parts procurement. In Fig. 45, first a user, such as a purchasing manager from an aircraft manufacturer, can log on to a net market or web portal through a network. Next, as shown in Fig. 46, the user is presented with filtering questions as explained above. In Fig. 47 horizontal slider bars are presented to perform pairwise comparisons on high level criteria. In Fig. 48 the user is reminded to perform lower level trade-offs and in Fig. 49 horizontal slider bars are presented to perform pairwise comparisons on sub-factors or lower level criteria.

Fig. 50 is a screen view of a results page illustrating the product, here an aircraft engine, which best fits the user's wants and needs. Preferably, the results will link users to product specifications, product reviews, and procurement sites where a transaction can be consummated.

Figs. 51-53 illustrate a dynamic sensitivity analysis of the relationship of the weights and the priorities of the resulting selections, e.g., the engines. In Fig. 51, the rankings for the engines are shown on the right in the form of a horizontal bar graph, and the objectives or characteristics are indicated on the left in a group of individual horizontal slider bars. The user can dynamically change the illustrated horizontal bars corresponding to the characteristics so as to change their weights and cause the system to recompute the product rankings. In Fig. 52, the results are ranked and the horizontal bar graph corresponding to the ranked products is shown broken down into components. In this way the user can visually inspect how each factor contributed to the overall result. Also, a user may decide that performance is a more important goal and the user may drag the performance bar to the right to indicate such a change of mind. For example, in Fig. 53 the product rankings have been altered as a result of the user changing the preference of performance from 7% in Fig. 52, to 39% in Fig. 53 and, in this example, a different engine has a higher ranking. Fig. 54 shows an exemplary dynamic gap analysis graph similar to that of Fig. 15 to assist the user in determining how each product performs against the other with respect to each factor.

Fig. 55 provides a static comparison of characteristics of two alternatives. This plot is known as head-to-head comparison. For example, the screen of Fig. 55 illustrates a comparison between the General Electric 1158 and the Rolls Royce RB211-524, wherein price and maintenance are rated higher for the Rolls Royce and performance, delivery and fuel efficiency are rated higher for General Electric . Also, the overall score is higher for

General Electric. This display can be constructed based on the derived weights and ratings of the alternatives.

To further describe the second preferred embodiment and related embodiments, it is useful at this point to compare the similarities and differences between the first and second preferred embodiments.

Referring to Figure 56, in the first preferred embodiment a buyer (or user – they are synonymous in this description) accesses at step 5605 a system RFX (request for proposal (RFP) or request for quotation (RFQ)) or product evaluation engine by directing a browser to a previously established URL for a preferred system. The system responds by presenting the buyer with a login screen at step 5610 (see also Figure 68, step 6810), as is known in the art. The buyer is presented with three options: (1) enter the site anonymously; (2) enter an established user name; or (3) establish a new user name by typing one in and answering demographic questions that will be associated with all of the buyer's purchasing profiles.

After successfully logging in to the site (site and portal are used interchangeably in this description) the buyer is required at step 5615 (see also Figure 68, step 6815) to select a model. A model selection interface is depicted in Figure 59. A model has a one-to-one relationship with a product, although a product may have a one-to-many relationship with a model. For example, a product may have multiple types of models that a buyer can use to evaluate offerings by multiple suppliers, but each model can only evaluate one pre-specified type, class, or category of product. A model is preferably composed of 5 essential elements: (1) objectives, organized in a parent-child structure that when transversed creates a decision tree; (2) a set of rating scales that have a one-to-one correspondence with the covering objectives of the decision tree; (3) a set of filter or needs questions related to the entire alternative or product database; (4) informative text to educate, guide, and clarify terms for the buyer; (5) sequence, rules, and flow-of-analysis applets and a tradeoffs applet.

Next in the process, at step 5620 (see also Figure 68, step 6820), the buyer selects a decision profile (see Figure 60), each of which has a many-to-one relationship with a model. This structure is depicted in Figure 58: one model can have many profiles but a profile is specific to one and only one model. There are two types of decision profiles available to a buyer: local and global. A local decision profile is one that was created by or specifically for a buyer; it can be modified at the buyer's discretion. A global decision profile (the default

profile is global) is created by the operator of the system site. It is available to all users and may not be modified by any buyer. A buyer may, however, make changes to a global decision profile and save it under a new name as a local profile. It is important to note that a decision profile is related to a buyer's demographic information, but the buyer's decision profile is actually composed of 3 essential elements: (1) a set of responses to filter questions; (2) a set of judgments relating to the model's tradeoffs; and (3) a selected set of rating scales. Demographic information can be related to many profiles owned by one buyer, but it is not "contained" in the profile. A buyer is not required to supply demographic information in order to maintain a decision profile.

Once a profile is selected by the buyer and loaded by the system, the buyer has several choices available. The buyer may choose to perform all steps in the process and modify or verify the selected profile, or may visit either filters or tradeoffs independently in order to modify decision profile settings. Or the buyer may choose to go directly to results, bypassing both filters and tradeoffs; settings of the selected decision profile will be used to evaluate the resulting set of selected products or alternatives. These options are represented in FIG. 56 by the dotted lines.

At step 5625 (see also Figure 68, step 6825), needs or filters are administered. During this step the buyer selects a set of business terms and product specifications (see Figure 61) which an alternative or product is required to meet in order to be included in the evaluation process. Examples of this may be a lead-time of less than 30 days, four ports, a footprint of less than 4 sq. ft., or 24/7 technical support. The results from the filter questions are transformed into standard SQL queries and used at step 5630 (see also Figure 68, step 6830) to cull down the existing product or alternative database. The result of this process is a final set of unranked alternatives or products available to the buyer.

Tradeoffs are the next step (step 5635) (see also Figure 68, step 6835) in the process. The buyer is presented with an applet that delivers all of the decision tree's objectives organized in pairs. See Figure 62. Corresponding to these pairs are bars that can be dynamically slid left or right in order to represent one of 3 relations between the objectives: (1) importance; (2) preference; or (3) likelihood. The buyer completes these comparisons by setting the bars to represent one of three previous conditions of the one-to-one relationship. See Figure 63. For example, perhaps safety is viewed as 20% more important than

performance when buying a car, or leather seats are 40% more preferable than a 5 disk CD player in a new car. The visual results of the tradeoffs are the ratios of the lengths of the top lines to the lengths of the bottom lines (see Figure 62). These ratios are called *judgments*, and are stored in arrays or matrices. Once these are populated, the system initiates AHP mathematics (see FIGS. 21-24 and accompanying text), which at step 5640 (see also Figure 68, step 6840) calculates the buyer's priorities for the purchasing objectives.

With the alternative set identified, the next step (step 5645) (see also Figure 68, step 6845) is to apply rating scales. The rating scales are preferably defined by the portal owner or customer. The definition can be accomplished, for example, with the assistance of ExpertChoice development software, available from ExpertCommerce, Inc., 6 East 32nd Street / 4th floor, New York, NY 10016. Preferably, there is a rating scale assigned to each and every covering objective. Missing data for a covering objective is not critical, as the synthesis algorithms (see Figs. 24 and 36 and accompanying text) overcome this by not assigning a value score to that covering objective. This means that those alternatives or products that do not have complete information are only penalized the proportional and specific amount of the missing data point, as defined by the buyer. The rating scales are applied by taking the transformed raw score and normalizing it by running it through either a utility curve (see Figs. 19, 25, 26, 36, 40 and accompanying text), a rating scale, or an interval step scale. The result is a value score between 0 and 1.

Once the system has the data points' or covering objectives' value scores, at step 5650 (see also Figure 68, step 6850) synthesis is performed to assign an overall value score and corresponding rank to the alternatives or products. Synthesis is the process that brings the buyer's priorities and the product's specifications together. See Figs. 24 and 36. The overall value score, like the data point value score, is a number between 0 and 1. The alternatives are sorted based on the overall value scores, and displayed at step 5655 (see also Figure 68, step 6855) to the user in a dynamic results page, depicted in Figure 64, that allows the user to re-sort the alternatives by any of the alternatives' factors. The results page contains links to analysis tools, tabular information on the actual specifications, and business terms, as well as links to initiate transactional actions.

Another sub-process is available at this point in the process: feedback. Calculations are run across priorities and alternatives so that feedback (see Figure 27 and accompanying

text) can be provided at step 5657 (see also Figure 68, step 6857) to the buyer, enabling the buyer to analyze how an objective's importance is related to an alternative. This is contrary to current decision-making processes. After receiving this feedback, a buyer can drop an objective or change priorities to produce a new set of overall value scores that may better meet the buyer's needs. For example, perhaps price is found to be of minimal impact on a decision, even thought it has a high priority. Feedback would enable the user to remove it and either accurately redistribute its priority to the remaining objectives or accept new user-defined priorities. Then, by using super-matrix AHP calculations, new priorities would be generated and consequently a new overall value score assigned.

The buyer can perform another type of analysis on the decision as well, at step 5660 (see also Figure 68, step 6860): dynamic sensitivity. There are three forms of dynamic sensitivity analysis: (1) standard dynamic (see Figures 51, 52, and 53); (2) Gap analysis (see Figures 54 and 72); and (3) Head-to-Head (see Figures 16 and 71). All three allow a buyer to test an alternative's sensitivity to changes in objectives' priorities. The results and the changes to the priorities are depicted graphically, for ease of use and understanding. See Figures 37, 42, 43, 44, 51-55, and accompanying text.

Any time after results are delivered, the buyer may at step 5665 (see also Figure 68, step 6865) initiate an action (most commonly, buy). The buyer's selection is sent to the portal's buy engine, where the purchase process happens. Other potential actions include but are not limited to: (1) negotiate; (2) save the decision; (3) request additional information; (4) email this decision to someone; and (5) compare historical decisions.

We now contrast the second preferred embodiment with the just-discussed first preferred embodiment. Still referring to Figure 56, at step 5670 (see also Figure 69, step 6970) a buyer accesses over the Internet what is known in the art as a Net Market Maker (NMM) (also called a net market; see above) site, and logs in or otherwise establishes a relationship with the NMM. An NMM is a kind of Business-to-Business (B2B) Internet-based merchant who facilitates commerce between and for businesses. Most NMMs fall into three categories: (1) exchanges where buyers and seller post needs and haves and deals are conducted in real-time with "market pricing"; examples of this are e-Steel, Covisant (for used auto parts), and Gemconnect (for gems); (2) commerce enablers that provide purchase-to-delivery supply-chain management and financial services; three examples are Ariba,

CommerceOne, and FreeMarkets; and (3) vertical markets. These last are closed markets that tend to be buyer driven and that contain catalog data. These are typically for commonly-defined and frequently-used goods. The leaders are Vertical Net, ZoHo, and Healtheon/WebMD.

Once a buyer has logged into an NMM of choice, and the NMM offers EC's evaluation service for Requests For Proposal or Requests For Quote (RFX), the buyer calls the application and the buyer's login information is passed (at step 5675) (see also Figure 69, step 6975) to EC, so that the user is not tasked with repeated log-in screens.

The buyer is now offered a selection of models that the NMM is allowing the user to utilize for an RFX transaction. The definition and attributes of a model as stated above also apply here, with one additional, sixth, element. The sixth element is a list of all available suppliers for a specific product. The buyer selects a model at step 5680 (see also Figure 69, step 6980) to begin the process. See Figure 59.

After a model has been selected the application presents to the buyer all global and local decision profiles available to the buyer, based on both the model and the buyer login information. The definition and attributes of a profile as stated above also apply here with one addition: a buyer may also select a set of rating scales to be related to the buyer's decision profile. These rating scales are preferably defined by the NMM and related to one specific model. At step 5685 (see also Figure 69, step 6985) the buyer selects a profile with a rating scale for this decision. As in the first embodiment, the buyer now has the choice of continuing through other steps, which include both tradeoffs and filters, or to go directly to the submission of an RFX form.

Following the full path, at step 5690 (see also Figure 69, step 6990) filters are administered. Filter questions serve the same purpose as in the first embodiment, but instead of generating SQL statements to cull a database, they are used to populate, at step 5695 (see also Figure 69, step 6995), the RFX request form that a supplier completes. Once the RFX form is completed by the supplier, the supplier's inputs are verified to ensure that minimum or maximum requirements are met. This process, in the second embodiment, replaces the culling of the database in the first embodiment.

At step 56100 (see also Figure 69, step 69100), tradeoffs are made available to the user. The rules, manipulation, and data captured in tradeoffs are the same as those stated

previously. Once tradeoffs are completed, the judgments are run at step 56105 (see also Figure 69, step 69105) through the same AHP mathematics as discussed previously, to produce a set of priorities for the buyer. The resultant priorities and the data points that correspond to the covering objectives are also staged for the RFX request form that the supplier will complete.

The buyer may come to this step after setting filters and tradeoffs or they may have come directly after loading a profile. Either way, the application now has the information to generate, at step 56110 (see also Figure 69, step 69110), an RFX request form, depicted in Figure 70. This form is completed by one or more suppliers (for ease of explanation, we shall often assume in the following discussion that there is just one supplier), contains the buyer's needs and wants for the decision, and provides a method for the supplier to respond. This form, generated by the application, preferably resides with the application on the web-facing application servers, so that suppliers may login and complete the form through the NMM.

Once the form is posted the supplier is notified at step 56115 (see also Figure 69, step 69115) of its existence and location. An email containing a hot link with embedded password and transaction identifier is preferably sent to all suppliers who are associated with a model.

At a prescribed time, or based on an event trigger, EC or the NMM, depending on which system is forward-facing, will stop accepting supplier responses. Once the RFX is closed, the preferred software runs, at step 56120 (see also Figure 69, step 69120), the filter SQL statements against the responses, to eliminate those bids or alternatives that do not meet the buyer's needs. Then the evaluation data which was asked for in correspondence with the objectives delivered in tradeoffs is transformed to a prescribed state so that the evaluation engine can be run on it.

Once all supplier responses are received, checked, and transformed, the application at step 56125 (see also Figure 69, step 69125) applies the rating scales selected through relationship with the decision profile to normalize the transformed supplier data. The process of applying rating scales is the same as detailed previously. Once the rating scales have produced the covering objectives' value score, the application performs synthesis at step 56130 (see also Figure 69, step 69130) to produce an overall value score. The detail and figures for synthesis here are the same as previously described.

Using the overall value scores, the results of the RFX evaluation are displayed to the buyer. The alternatives are sorted based on the overall value scores and displayed at step 56135 (see also Figure 69, step 69135) to the user in a dynamic page. See Figure 64. The functionality of the page allows the buyer to re-sort the alternatives by any of the alternatives' factors. The results page contains links to the analysis tools, tabular information on the actual specifications and business terms as well as links to initiate transactional actions.

The buyer can now, at step 56140 (see also Figure 69, step 69140), test the sensitivity of the decision by performing sensitivity analysis. There are three forms of sensitivity analysis: (1) dynamic (see Figures 51, 52, and 53); (2) Gap analysis (see Figures 54 and 72); and (3) Head-to-Head (see Figures 16 and 71). All three allow a buyer to test an alternative's sensitivity to changes in objectives' priorities. The results and the changes to the priorities are depicted graphically for ease of use and understanding. See Figures 37, 42, 43, 44, and 51-55. Additionally, there are multiple reporting options available from results including but not limited to: (1) a summary for each alternative (see Figures 65 and 67); (2) side-by-side tabular comparison; and (3) a transaction report outlining the decision process (see Figure 66).

Any time after results are delivered, the buyer may initiate an action at step 56145 (see also Figure 69, step 69145) (most commonly, a purchase). The buyer's selection is sent via the NMM to the supplier where the purchase process in managed. Other actions include but are not limited to: (1) negotiate; (2) save the decision; (3) request additional information;; (4) email the decision to someone; and (5) compare historical decisions.

The present invention is not to be limited in scope by the specific embodiments described herein. Indeed, modifications of the invention in addition to those described herein will become apparent to those skilled in the art from the foregoing description and accompanying figures. Doubtless, numerous other embodiments can be conceived that would not depart from the teaching of the present invention, whose scope is defined by the following claims.

WHAT IS CLAIMED IS:

1. A method of assisting a user, communicating over the Internet with a server computer in selecting a desired product (a service is also referred to herein as a product), wherein a plurality of products are described in a product database using product records, at least some of the product records include a plurality of product characteristics, comprising:

providing over the Internet to the user filtering questions regarding the desired product;

receiving over the Internet user's responses to the filtering questions;

based on the responses, filtering the product records stored in the product database so as to obtain a subset of relevant product records;

enabling the user to perform a graphical pairwise comparison of at least two characteristics relating to the desired product so as to obtain pairwise comparison data;

converting the pairwise comparison data into weights allocated to the characteristics, wherein the weights represent relative importance of the corresponding characteristics to the user; and

prioritizing the products based on the determined weights and ratings of the characteristics of the products.

2. The method of claim 1 wherein the ratings associated with the characteristics have been provided by an expert.

3. The method of claim 1 further comprising providing for display to the user a description of a predetermined number of the products determined by the step of prioritizing to have a higher priority than the other products.

4. The method of claim 3 further comprising providing for display to the user a graphical representation of the weights associated with the characteristics of the desired product.

5. The method of claim 4 further comprising in response to a user graphically adjusting the weights associated with the characteristics of the desired product, recomputing priorities of the products.

6. The method of claim 1 further comprising enabling the user to enter a second set of filtering responses and filtering at least some of the product records based on the second set of the responses.

7. The method of claim 6 further comprising determining whether the filtering based on the second set of responses eliminated an unduly large number of products, and providing the user with a capability to revise the second set of filtering responses.

8. The method of claim 1 further comprising providing the user with a capability to enter over the Internet pairwise comparisons for subcharacteristics of the characteristics of the products.

9. The method of claim 8 further comprising determining weights of the subcharacteristics.

10. The method of claim 1 further comprising searching user records storing demographic data for a corresponding user and a history of previous product selection so as to identify a subset of users who are similar to the user.

11. The method of claim 10 further comprising determining representative weights representing the weights stored for the product characteristics in the records of the subset of similar users.

12. The method of claim 11 further comprising determining suggested products based on the representative weights identified for the subset of similar users.

13. The method of claim 1 further comprising determining a second set of filtering questions based on the responses to the first set.

14. The method of claim 1 further comprising identifying a subset of relevant characteristics based on the responses to filtering questions.

15. The method of claim 1 wherein the step of prioritizing includes applying the analytic hierarchy process.

16. A computer server for assisting a user, communicating over the Internet with the server, in selecting a desired product (service is also referred to herein as a product), wherein a plurality of products are stored in a product database using product records, at least some of the product records include a plurality of product characteristics, comprising:

software for determining and providing over the Internet to the user filtering questions regarding the desired product;

software for receiving over the Internet user's responses to the filtering questions and, based on the responses, filtering the product records stored in the product database so as to obtain a subset of relevant product records;

software for enabling the user to perform a graphical pairwise comparison of at least two characteristics relating to the desired product, so as to obtain pairwise comparison data;

software for converting the pairwise comparison data into weights allocated to the characteristics, wherein the weights represent relative importance of the corresponding characteristics to the user; and

software for prioritizing the products based on the determined weights and ratings of the products characteristics.

17. The server of claim 16 further comprising providing for display to the user a description of a predetermined number of the products having higher priority than other products as determined by the software for prioritizing.

18. The server of claim 17 further comprising providing for display to the user a graphical representations of the weights associated with characteristics of the desired product.

19. The server of claim 18 further comprising software for recomputing priorities of the products in response to a user graphically adjusting the weights associated with the characteristics of the desired product.

20. The server of claim 16 further comprising software for providing a user with a second set of filtering questions determined based on the responses to the first set, enabling the user to enter a second set of filtering responses, and filtering at least some of the relevant product records based on the second set of the responses.

21. The server of claim 20 further comprising software for determining whether the filtering based on the second set of responses eliminated an unduly large number of products, and providing the user with a capability to revise the second set of filtering responses.

22. The server of claim 16 further comprising software for providing the user with a capability of entering over the Internet pairwise comparisons for at least some subcharacteristics of the characteristics of the products, wherein the subcharacteristics are selected based on the responses to the first set of filtering questions.

23. The server of claim 22 further comprising software for determining weights of at least some of the subcharacteristics.

24. The server of claim 16 further comprising software for searching user records, which store demographic data of the corresponding users so as to identify a subset of users who are similar to the user.

25. The server of claim 24 further comprising software for processing weights of the product characteristics from the records of the subset of users so as to determine representative weights.

26. The server of claim 25 further comprising software for determining suggested products based on the representative weights identified for the subset of similar users.

27. The server of claim 16 wherein the software for prioritizing includes software implementing the analytic hierarchy process.

28. A method of assisting a user, communicating over the Internet with a server computer, in selecting a desired product (a service is also referred to herein as a product), wherein a plurality of products are described in using product records, at least some of the product records include a plurality of product characteristics, and wherein utility curves are stored for at least some of the characteristics, such a utility curve indicates how a property of such a characteristic effects its rating, comprising:

providing over the Internet to the user filtering questions regarding the desired product;

receiving over the Internet user's responses to the filtering questions;

based on the responses, filtering the product records so as to obtain a subset of relevant product records;

based on the responses, determining relevant characteristics of the products;

enabling the user to perform a graphical pairwise comparison of at least two of the relevant characteristics so as to obtain pairwise comparison data;

converting the pairwise comparison data into weights allocated to at least some of the relevant characteristics, wherein such a weight represents relative importance of the corresponding characteristic to the user; and

prioritizing the products based on the determined weights and ratings of the relevant characteristics, wherein at least some of the ratings have been derived using utility curves.

29. The method of claim 28 wherein the utility curves have been provided by a group of experts.

30. The method of claim 28 further comprising providing for display to the user a description of a predetermined number of the products, determined by the step of prioritizing, having a higher priority than the other products.

31. The method of claim 28 further comprising providing for display to the user a graphical representations of the weights associated with the characteristics of the desired product.

32. The method of claim 31 further comprising in response to a user graphically adjusting the weights associated with the desired product, recomputing priorities of the products.

33. The method of claim 28 further comprising enabling the user to enter a second set of filtering responses and filtering at least some of the product records based on the second set of the responses, wherein the second set of filtering responses is in response to a second set of filtering questions.

34. The method of claim 33 further comprising determining whether the filtering based on the second set of responses eliminated an unduly large number of products, and providing the user with a capability to revise the second set of filtering responses.

35. The method of claim 28 further comprising providing the user with a capability to enter over the Internet pairwise comparisons for at least some of the subcharacteristics of the characteristics of the products.

36. The method of claim 28 further comprising searching user records storing demographic data of a corresponding user and a history of previous product selection by the corresponding user so as to identify a subset of users who are similar to the user.

37. The method of claim 36 further comprising determining representative weights for product characteristics based on the records of the subset of similar users.

38. The method of claim 37 further comprising determining suggested products based on the representative weights determined from the records of the subset of similar users.

39. The method of claim 28 further comprising determining a measure of inconsistency based on the weights allocated to at least some of the characteristics.

40. The method of claim 39 wherein the measure of inconsistency is in relation inconsistency determined from records of similar users.

41. The method of claim 28 wherein the step of prioritizing includes applying the analytic hierarchy process.

42. A method of assisting a user communicating over the Internet with a server computer in selecting a desired product (a service is also referred to herein as a product) wherein a plurality of products are described using stored product records and wherein at least some of the products include a plurality of product characteristics and wherein a plurality of user records are stored in a user storage, at least some of the user records include user's demographic profiles and history of previous user's selection process, comprising:

determining demographic information of the user;

searching the user storage so as to identify user records of other users having similar demographic information to the user demographic information;

determining weights representing relative importance of characteristics stored for at least some of the other users having similar demographic information;

determining representative weights allocated to characteristics based on the weights stored for the other users having similar demographic information; and

prioritizing the products based on the representative weights and based on ratings of the products identified from stored information for the products.

43. The method of claim 42 wherein the ratings are identified by retrieving scores stored in connection with the characteristics.

44. The method of claim 42 wherein the ratings are identified by using a utility curve.

45. The method of claim 42 further comprising determining weights allocated to subcharacteristics based on demographic information stored for the similar users.

46. The method of claim 42 further comprising enabling a user to conduct dynamic sensitivity analysis.

47. The method of claim 42 wherein the step of prioritizing includes the analytic hierarchy process.

48. A method of assisting a user communicating over the Internet with a server computer in selecting a desired product (a service is also referred to herein as a product), wherein the plurality of products are described in the database using product records at least some of the product records include a plurality of product characteristics comprising:

prompting the user to enter a textual description of a preferred product and receiving textual input from the user;

determining, based on the textual input of the user, filtering data;

filtering the product records stored in the product database based on the filtering data so as to identify a relevant subset of products;

determining, based on the textual inputs, priorities allocated to characteristics of the product wherein the priorities represent relevant importance of the corresponding characteristics to the user; and

prioritizing the product based on the determined priorities and ratings of the characteristics of the relevant subset of products.

49. The method of claim 48 wherein the step of prioritizing is performed using the analytic hierarchy process.

50. The method of claim 48 further comprising providing for display to the user a description of a predetermined number of the products, which have a higher priority than other products, determined by the step of prioritizing.

51. The method of claim 50 further comprising providing for display to the user a graphical representations of the weights associated with the characteristics of the predetermined number of the products having the higher priority than the other products.

52. The method of claim 51 further comprising in response to a user graphically adjusting the weights associated with the characteristics of the predetermined number of the products, recomputing priorities of the products.

53. The method of claim 52 further comprising searching user records each of which stores demographic data of a user and a history of previous selections so as to identify a subset of similar users.

54. The method of claim 53 further comprising processing weights stored for the product characteristics in the records of the subset of users so as to arrive at representative weights.

55. The method of claim 54 further comprising determining suggested products based on the representative weights identified for the subset of similar users.

56. A method of assisting a user communicating over the Internet with a server computer in selecting a desired product (a service is also referred to herein as a product), wherein a plurality of products are described in a database using product records at least some of the product records include a plurality of product characteristics comprising:

entering pairwise comparisons for at least some of the characteristics of the desired product;

determining weights associated with the characteristics;

determining an inconsistency rating of the weights; and

determining a representative inconsistency rating representing inconsistencies of weights entered by similar users.

57. The method of claim 56 further comprising enabling the user to change weights based on the inconsistency rating.

58. The method of claim 56 wherein the step of determining weights includes the analytic hierarchy process.

59. A method of assisting a user, communicating over a network with a server computer in selecting a desired product (a service is also referred to herein as a product), wherein a plurality of products are described in a product database using product records, at least some of the product records include a plurality of product characteristics, comprising:

providing over the network to the user filtering questions regarding the desired product;

receiving over the network user's responses to the filtering questions;

based on the responses, filtering the product records stored in the product database so as to identify a subset of relevant products;

determining weights of the characteristics of the desired product, wherein the weights represent relative importance of the corresponding characteristics to the user; and

prioritizing the products based on the determined weights.

60. The method of claim 59 wherein the network is the Internet.

61. The method of claim 59 further comprising providing for display to the user a description of a predetermined number of the products determined by the step of prioritizing to have a higher priority than the other products.

62. The method of claim 61 further comprising providing for display to the user a graphical representation of the weights associated with the characteristics of the desired product.

63. The method of claim 59 further comprising in response to a user graphically adjusting the weights associated with the characteristics of the desired product, recomputing priorities of the products.

64. The method of claim 59 further comprising providing the user with a capability to enter over the network pairwise comparisons for characteristics of the desired product, and wherein the network is the Internet.

65. The method of claim 59 further comprising determining weights of product subcharacteristics.

66. The method of claim 59 further comprising searching user records storing demographic data for a corresponding user and a history of previous product selection so as to identify a subset of users who are similar to the user.

67. The method of claim 66 further comprising determining representative weights representing stored weights for product characteristics in the records of the subset of similar users.

68. The method of claim 67 further comprising determining suggested products based on the representative weights identified for the subset of similar users.

69. The method of claim 59 further comprising determining a second set of filtering questions based on the responses to the first set.

70. The method of claim 59 further comprising identifying a subset of relevant characteristics based on the responses to filtering questions.

71. The method of claim 59 wherein the step of prioritizing includes the analytic hierarchy process.

72. The method of claim 59 wherein the weights are entered directly by the user.

73. The method of claim 59 further comprising determining inconsistency of the weights.

74. The method of claim 59 wherein the weights are entered using text input.

75. The method of claim 59 wherein the filtering questions are derived from text input.

76. The method of claim 59 further comprising for one of the products adjusting the allocated weights of its characteristics and performing AHP synthesis employing a supermatrix.

77. A computer server that assists a user, communicating over a network with the server, in selecting a desired product (a service is also referred to herein as a product), wherein a plurality of products are described in a product database using product records, at least some of the product records include a plurality of product characteristics, comprising:

software for providing over the network to the user filtering questions regarding the desired product;

software for receiving over the network user's responses to the filtering questions;

based on the responses, filtering the product records stored in the product database so as to identify a subset of relevant products;

determining weights of the characteristics of the desired product, wherein the weights represent relative importance of the corresponding characteristics to the user; and

prioritizing the products based on the determined weights.

78. The server of claim 77 wherein the network is the Internet.

79. The server of claim 77 further comprising software for providing for display to the user a description of a predetermined number of the products determined by software for prioritizing to have a higher priority than the other products.

80. The server of claim 77 further comprising software for providing for display to the user a graphical representation of the weights associated with the characteristics of the desired product.

81. The server of claim 80 further comprising software for recomputing priorities of the products in response to a user graphically adjusting the weights associated with the characteristics of the desired product.

82. The server of claim 77 further comprising software for providing the user with a capability of entering over the Internet pairwise comparisons for characteristics of the desired product.

83. The server of claim 77 further comprising software for determining weights of product subcharacteristics.

84. The server of claim 77 further comprising software for searching user records, which store demographic data for a corresponding user and a history of previous product selection so as to identify a subset of users who are similar to the user.

85. The server of claim 84 further comprising software for determining representative weights representing stored weights for the product characteristics in the records of the subset of similar users.

86. The server of claim 85 further comprising software for determining suggested products based on the representative weights identified for the subset of similar users.

87. The server of claim 77 further comprising software for determining a second set of filtering questions based on the responses to the first set.

88. The server of claim 77 further comprising software for identifying a subset of relevant characteristics based on the responses to filtering questions.

89. The server of claim 77 wherein software for prioritizing includes the analytic hierarchy process software.

90. The server of claim 77 wherein the weights are entered directly by the user.

91. A method of assisting a user, communicating over a network with a server computer, in selecting a desired product, wherein a plurality of products are described in a dynamically generated data table using product records, and wherein at least some of the product records include a plurality of product characteristics, comprising:

providing over the network to the user questions regarding the desired product;

receiving over the network the user's responses to the questions;

based upon the responses, providing over the network requests for proposals to at least one supplier to generate a data table of product records;

receiving over the network data reflecting a plurality of product characteristics;

enabling the user to perform a graphical pairwise comparison of at least two characteristics relating to the desired product so as to obtain pairwise comparison data;

converting the pairwise comparison data into weights allocated to the characteristics, wherein the weights represent relative importance of the corresponding characteristics to the user; and

prioritizing the products based on the determined weights and ratings of the characteristics of the products.

92. A method of assisting a user communicating over a network with a server computer to select a desired product, comprising:

receiving over the network from the user data regarding the user's preferences for characteristics regarding a desired product;

enabling the user to perform graphical pairwise comparisons of at least two characteristics regarding the desired product to obtain pairwise comparison data;

receiving over the network from the user the pairwise comparison data;

converting the pairwise comparison data into weights allocated to the characteristics, wherein the weights represent relative importance of the corresponding characteristics to the user;

based upon the data regarding preferences for characteristics and the received pairwise comparison data, providing over the network one or more requests for proposals to at least one supplier;

receiving data regarding one or more proposals in response to said one or more requests for proposals from said at least one supplier;

ranking said proposals by comparing them with said received data regarding preferences for characteristics and said received pairwise comparison data; and

transmitting said ranked proposals to said user.

93. A method of acquiring and matching an RFX from a buyer with supplier responses providing acceptable responses to the buyer, comprising the steps of:

receiving model selection data from a buyer computer via an electronic network;

receiving profile selection data from said buyer computer via said electronic network;

generating a supplier response form comprising RFX information;

notifying one or more suppliers regarding said response form;

receiving response form data from said one or more suppliers;

filtering said received response form data on a computer;

analyzing said received response form data on a computer; and

displaying said analyzed data on said buyer computer via an electronic network.

94. A method as in claim 93, wherein said analyzed data comprises ranked products.

95. A method as in claim 93, wherein the step of analyzing said received response form data comprises applying rating scales.

96. A method as in claim 93, wherein the step of analyzing said received response form data comprises performing synthesis.

97. A method as in claim 93, further comprising the step of enabling said buyer to perform further analysis on said analyzed data.

98. A method as in claim 97, wherein the analyzed data comprises sorted alternatives, and the analysis performed by said buyer comprises re-sorting the alternatives.

99. A method as in claim 97, wherein the analyzed data comprises alternatives, and the analysis performed by said buyer comprises performing sensitivity analysis on said alternatives.

100. A method as in claim 99, wherein said sensitivity analysis comprises dynamic analysis.

101. A method as in claim 99, wherein said sensitivity analysis comprises gap analysis.

102. A method as in claim 93, further comprising the step of receiving and storing product specification data.

103. A method as in claim 99, wherein said sensitivity analysis comprises head-to-head analysis.

104. A method as in claim 93, further comprising the step of receiving filter data from said buyer.

105. A method as in claim 104, wherein said filter data comprises business terms and product specifications.

106. A method as in claim 93, further comprising the step of receiving tradeoff data from said buyer.

107. A method as in claim 106, further comprising the step of applying AHP mathematics to said received tradeoff data.

108. A method as in claim 93, wherein said step of notifying one or more suppliers regarding said response form comprising RFX information comprises sending an email notification to said one or more suppliers.

109. A method as in claim 93, wherein the step of analyzing said received response form data comprises applying rating scales.

110. A method of providing RFX data to one or more suppliers and receiving acceptable responses, comprising the steps of:

providing model selection data to an NMM over a computer network;

providing profile selection data to said NMM over said computer network; and

viewing on a computer display ranked product data received from said NMM over said computer network.

111. A method as in claim 110, further comprising the step of providing filter data to said NMM over said computer network.

112. A method as in claim 110, further comprising the step of providing tradeoff data to said NMM over said computer network.

113. A method as in claim 112, wherein said tradeoff data is created using pairwise comparisons.

114. A method as in claim 113, wherein said pairwise comparisons are performed using bars that can be dynamically slid.

115. A method as in claim 114, wherein said bars represent the relations in the set consisting of importance, preference, and likelihood.

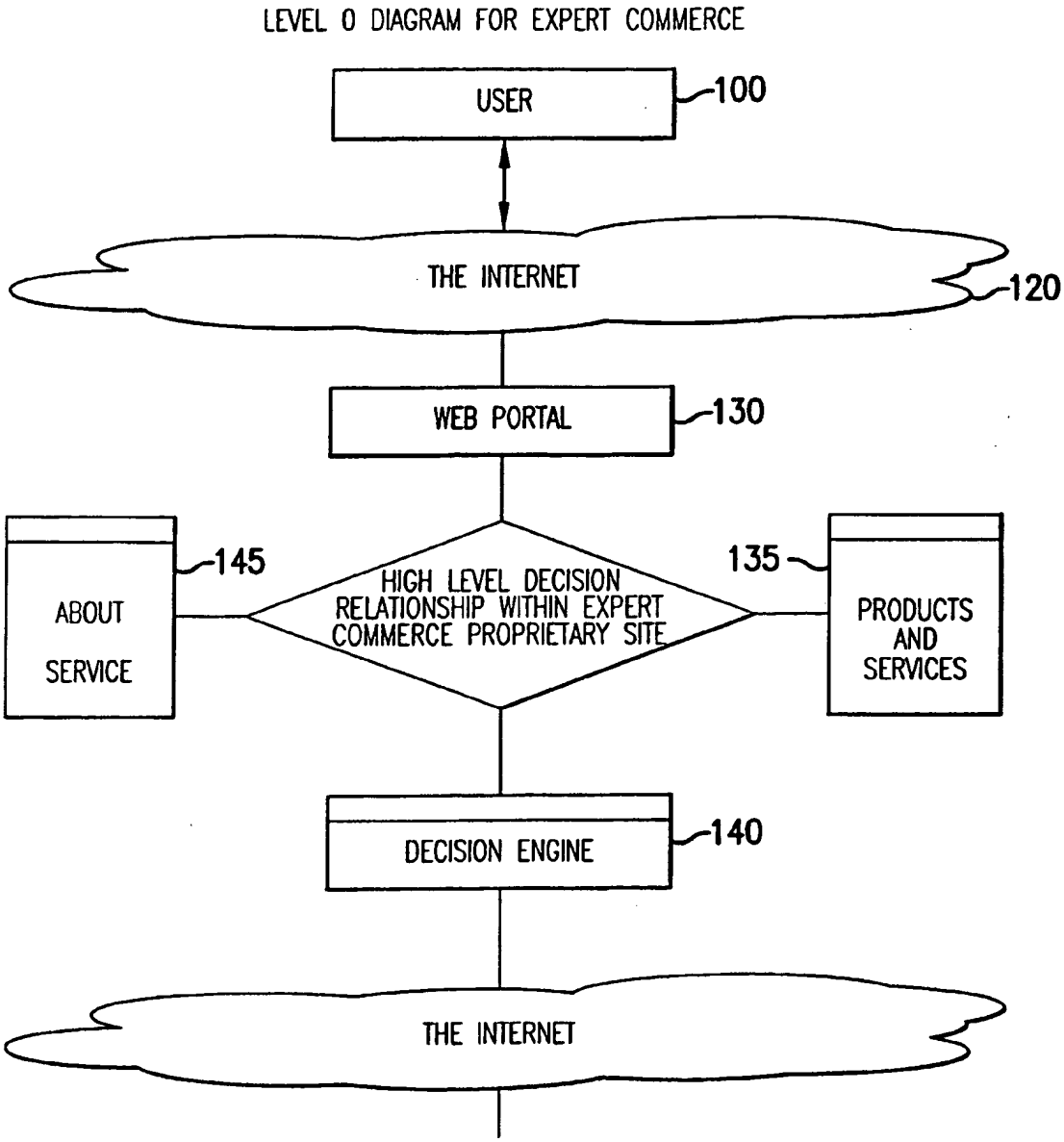

LEVEL 0 DIAGRAM FOR EXPERT COMMERCE
USER
100
THE INTERNET
120
WEB PORTAL
130
ABOUT SERVICE
145
HIGH LEVEL DECISION RELATIONSHIP WITHIN EXPERT COMMERCE PROPRIETARY SITE
135
PRODUCTS AND SERVICES
DECISION ENGINE
140
THE INTERNET

FIG.1

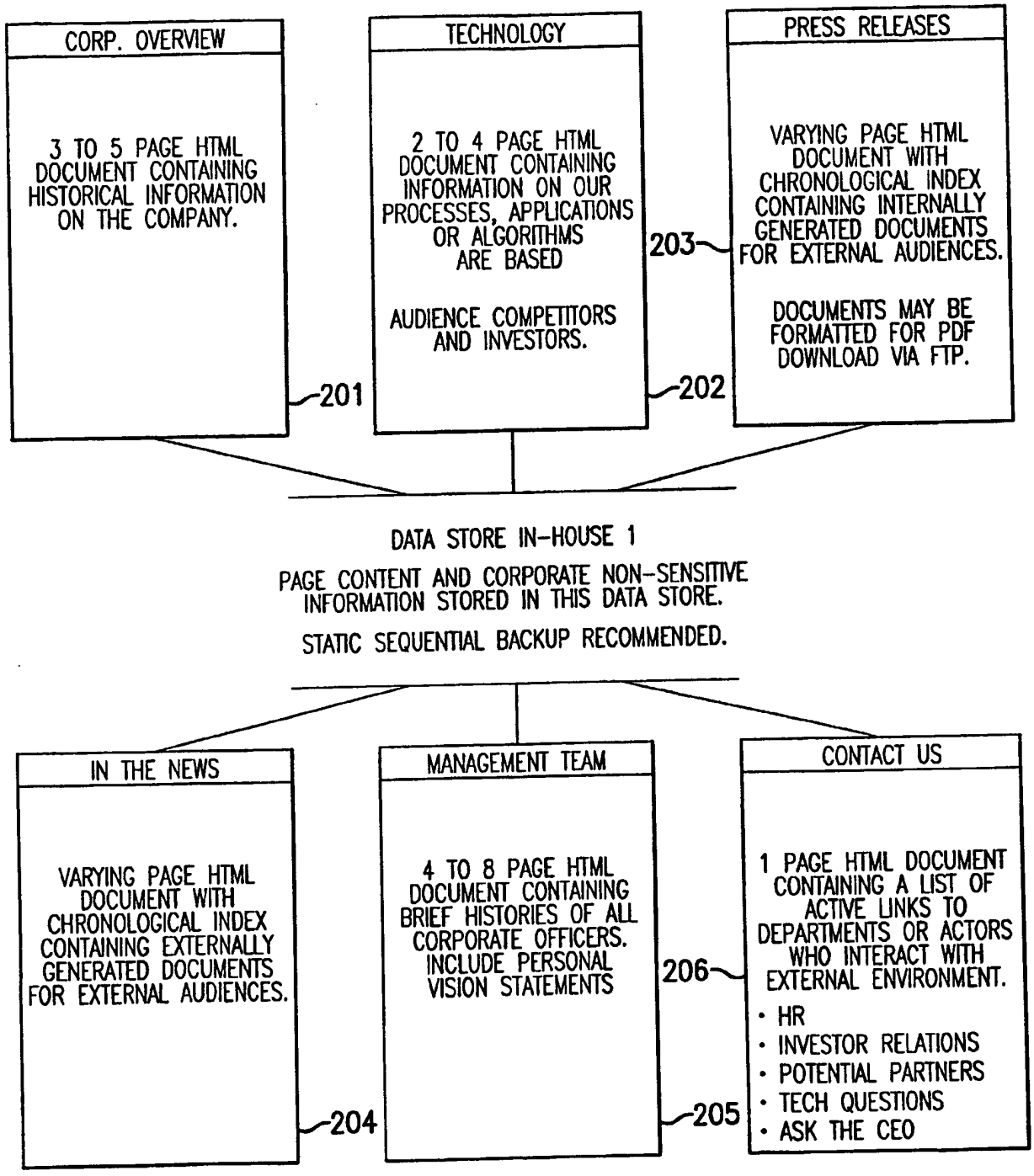

CORP. OVERVIEW
3 TO 5 PAGE HTML DOCUMENT CONTAINING HISTORICAL INFORMATION ON THE COMPANY.
201
TECHNOLOGY
2 TO 4 PAGE HTML DOCUMENT CONTAINING INFORMATION ON OUR PROCESSES, APPLICATIONS OR ALGORITHMS ARE BASED
AUDIENCE COMPETITORS AND INVESTORS.
202
PRESS RELEASES
VARYING PAGE HTML DOCUMENT WITH CHRONOLOGICAL INDEX CONTAINING INTERNALLY GENERATED DOCUMENTS FOR EXTERNAL AUDIENCES.
DOCUMENTS MAY BE FORMATTED FOR PDF DOWNLOAD VIA FTP.
203
DATA STORE IN-HOUSE 1
PAGE CONTENT AND CORPORATE NON-SENSITIVE INFORMATION STORED IN THIS DATA STORE.
STATIC SEQUENTIAL BACKUP RECOMMENDED.
IN THE NEWS
VARYING PAGE HTML DOCUMENT WITH CHRONOLOGICAL INDEX CONTAINING EXTERNALLY GENERATED DOCUMENTS FOR EXTERNAL AUDIENCES.
204
MANAGEMENT TEAM
4 TO 8 PAGE HTML DOCUMENT CONTAINING BRIEF HISTORIES OF ALL CORPORATE OFFICERS. INCLUDE PERSONAL VISION STATEMENTS
205
CONTACT US
1 PAGE HTML DOCUMENT CONTAINING A LIST OF ACTIVE LINKS TO DEPARTMENTS OR ACTORS WHO INTERACT WITH EXTERNAL ENVIRONMENT.
• HR
• INVESTOR RELATIONS
• POTENTIAL PARTNERS
• TECH QUESTIONS
• ASK THE CEO
206

FIG.2

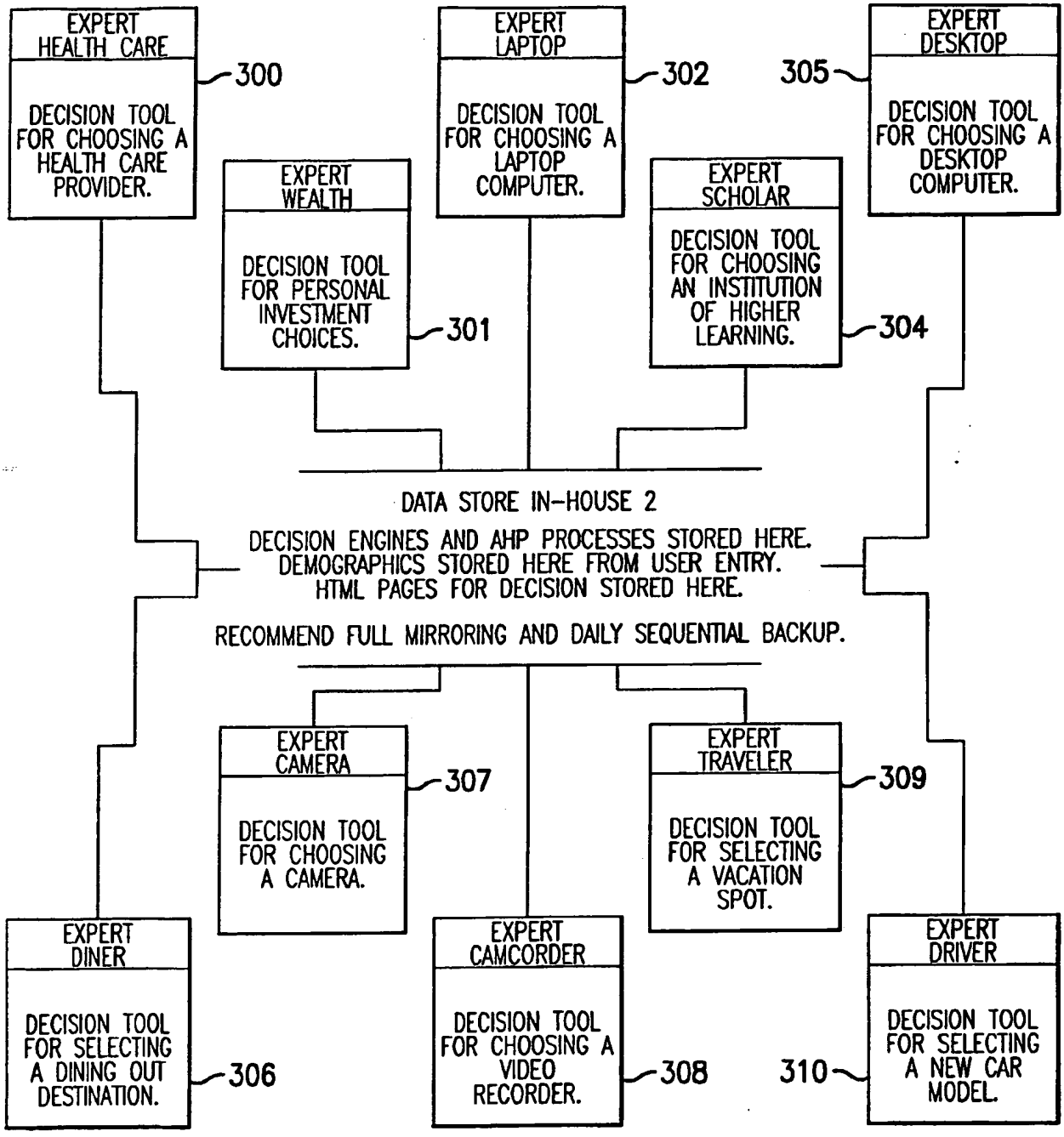

EXPERT HEALTH CARE
DECISION TOOL FOR CHOOSING A HEALTH CARE PROVIDER.
300
EXPERT LAPTOP
DECISION TOOL FOR CHOOSING A LAPTOP COMPUTER.
302
305
EXPERT DESKTOP
DECISION TOOL FOR CHOOSING A DESKTOP COMPUTER.
EXPERT WEALTH
DECISION TOOL FOR PERSONAL INVESTMENT CHOICES.
301
EXPERT SCHOLAR
DECISION TOOL FOR CHOOSING AN INSTITUTION OF HIGHER LEARNING.
304
DATA STORE IN-HOUSE 2
DECISION ENGINES AND AHP PROCESSES STORED HERE.
DEMOGRAPHICS STORED HERE FROM USER ENTRY.
HTML PAGES FOR DECISION STORED HERE.
RECOMMEND FULL MIRRORING AND DAILY SEQUENTIAL BACKUP.
EXPERT CAMERA
DECISION TOOL FOR CHOOSING A CAMERA.
307
EXPERT TRAVELER
DECISION TOOL FOR SELECTING A VACATION SPOT.
309
EXPERT DINER
DECISION TOOL FOR SELECTING A DINING OUT DESTINATION.
306
EXPERT CAMCORDER
DECISION TOOL FOR CHOOSING A VIDEO RECORDER.
308
310
EXPERT DRIVER
DECISION TOOL FOR SELECTING A NEW CAR MODEL.

FIG.3

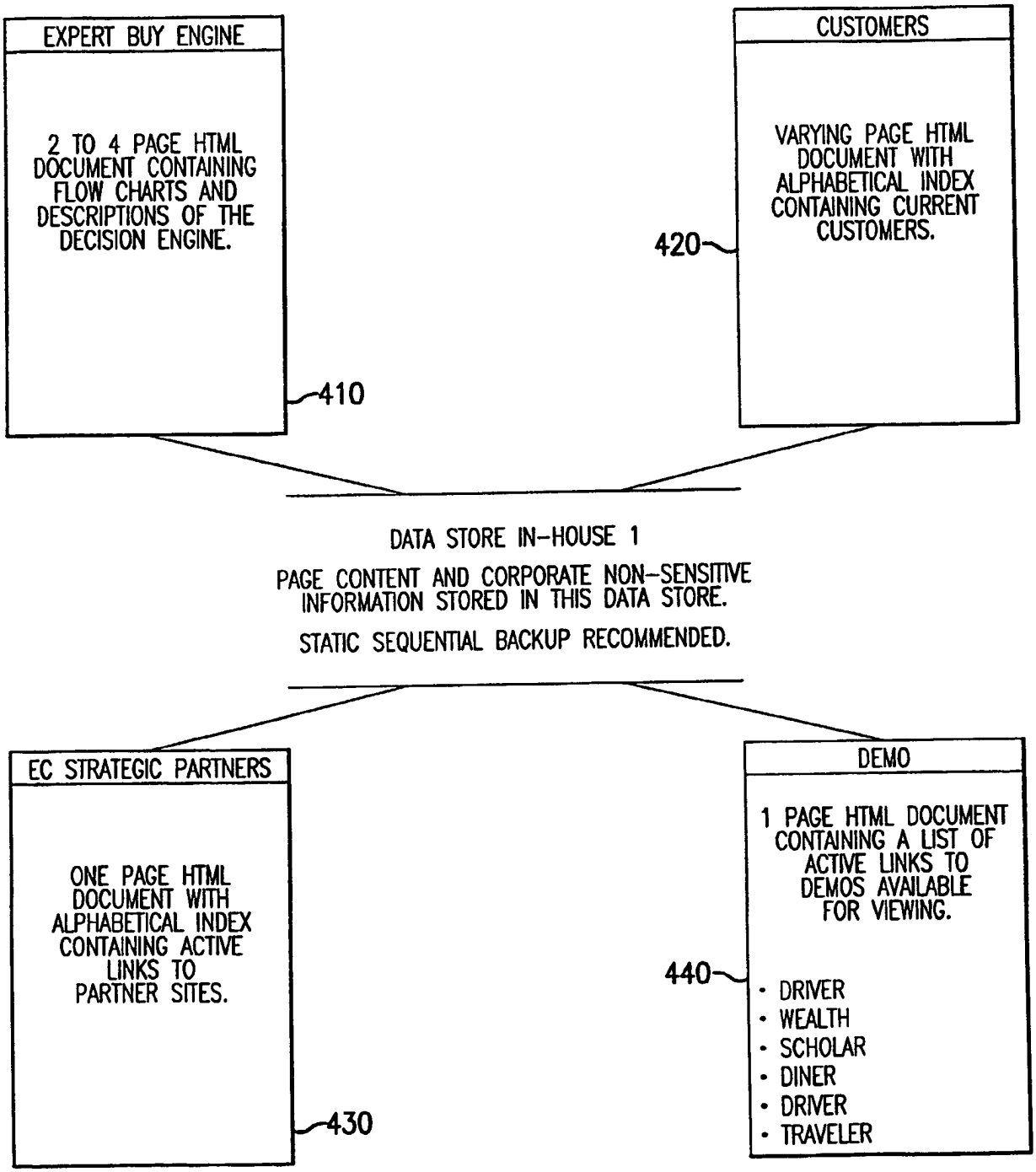

EXPERT BUY ENGINE
2 TO 4 PAGE HTML DOCUMENT CONTAINING FLOW CHARTS AND DESCRIPTIONS OF THE DECISION ENGINE.
410
CUSTOMERS
VARYING PAGE HTML DOCUMENT WITH ALPHABETICAL INDEX CONTAINING CURRENT CUSTOMERS.
420
DATA STORE IN-HOUSE 1
PAGE CONTENT AND CORPORATE NON-SENSITIVE INFORMATION STORED IN THIS DATA STORE.
STATIC SEQUENTIAL BACKUP RECOMMENDED.
EC STRATEGIC PARTNERS
ONE PAGE HTML DOCUMENT WITH ALPHABETICAL INDEX CONTAINING ACTIVE LINKS TO PARTNER SITES.
430
DEMO
1 PAGE HTML DOCUMENT CONTAINING A LIST OF ACTIVE LINKS TO DEMOS AVAILABLE FOR VIEWING.
440
• DRIVER
• WEALTH
• SCHOLAR
• DINER
• DRIVER
• TRAVELER

FIG.4

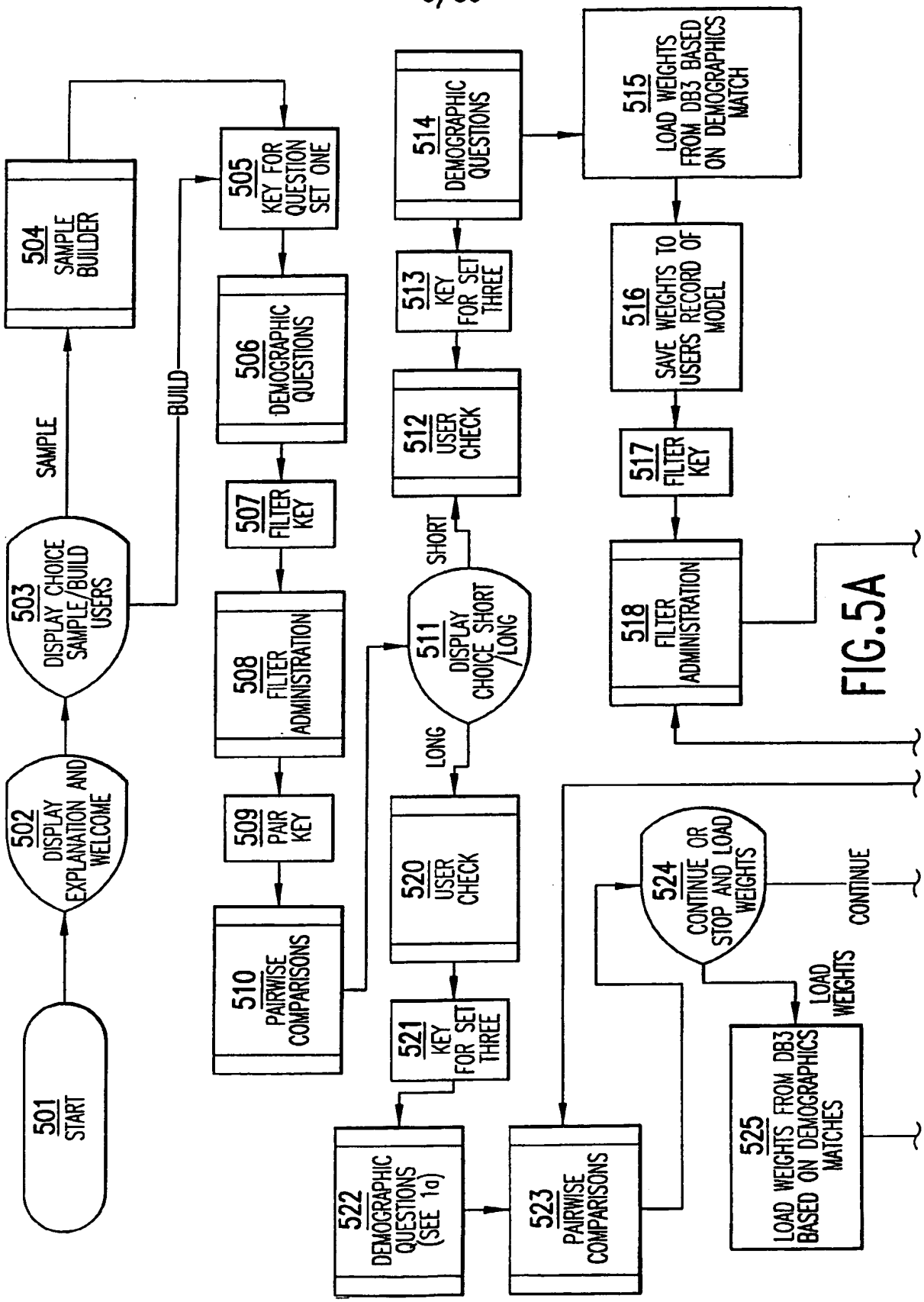

501 START
502 DISPLAY EXPLANATION AND WELCOME
503 DISPLAY CHOICE SAMPLE/BUILD USERS
SAMPLE
BUILD
504 SAMPLE BUILDER
505 KEY FOR QUESTION SET ONE
506 DEMOGRAPHIC QUESTIONS
507 FILTER KEY
508 FILTER ADMINISTRATION
509 PAIR KEY
510 PAIRWISE COMPARISONS
511 DISPLAY CHOICE SHORT /LONG
SHORT
LONG
512 USER CHECK
513 KEY FOR SET THREE
514 DEMOGRAPHIC QUESTIONS
515 LOAD WEIGHTS FROM DB3 BASED ON DEMOGRAPHICS MATCH
516 SAVE WEIGHTS TO USERS RECORD OF MODEL
517 FILTER KEY
518 FILTER ADMINISTRATION
520 USER CHECK
521 KEY FOR SET THREE
522 DEMOGRAPHIC QUESTIONS (SEE 10)
523 PAIRWISE COMPARISONS
524 CONTINUE OR STOP AND LOAD WEIGHTS
CONTINUE
LOAD WEIGHTS
525 LOAD WEIGHTS FROM DB3 BASED ON DEMOGRAPHICS MATCHES

FIG.5A

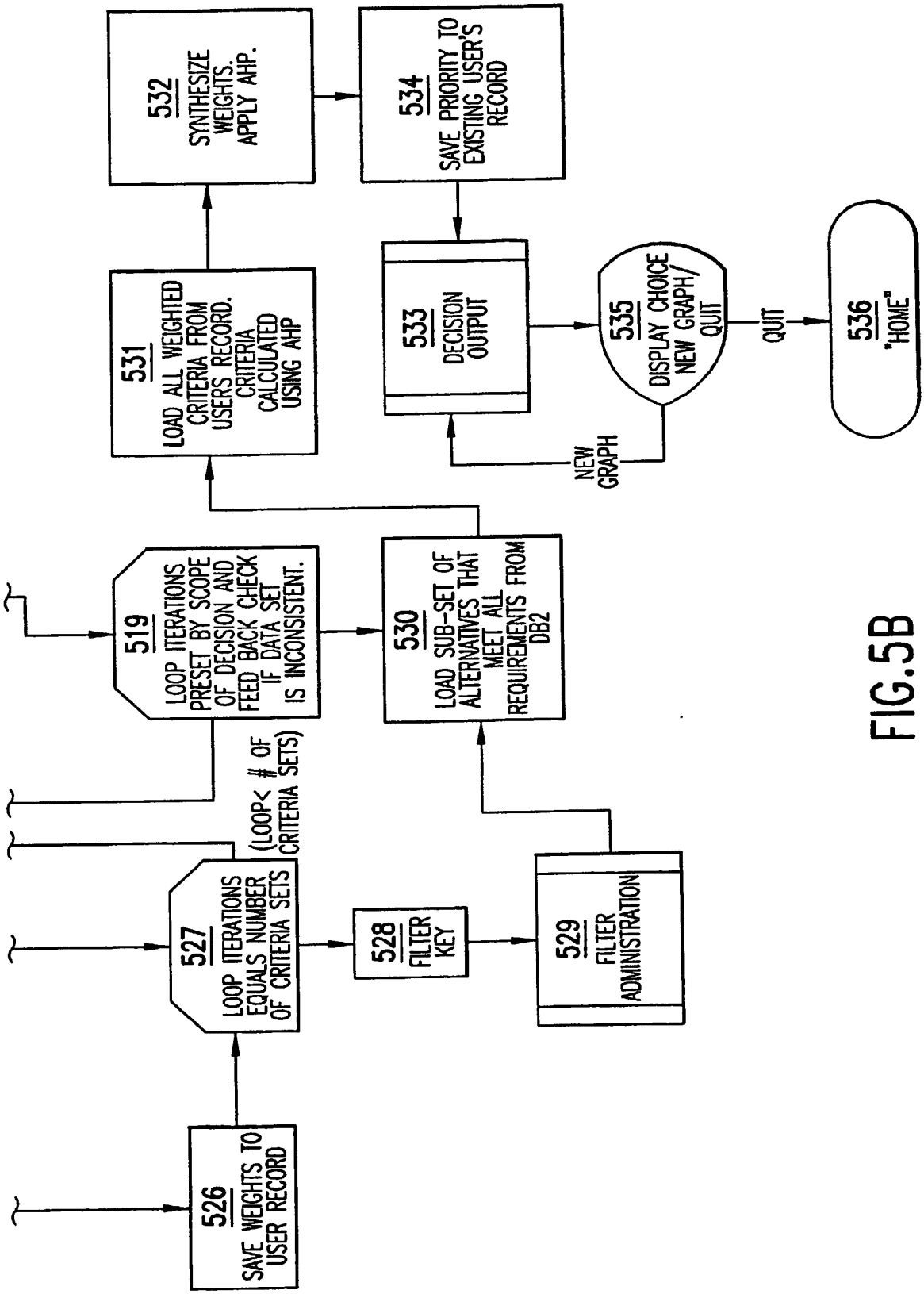

526
SAVE WEIGHTS TO USER RECORD
527
LOOP ITERATIONS EQUALS NUMBER OF CRITERIA SETS
(LOOP< # OF CRITERIA SETS)
528
FILTER KEY
529
FILTER ADMINISTRATION
519
LOOP ITERATIONS PRESET BY SCOPE OF DECISION AND FEED BACK CHECK IF DATA SET IS INCONSISTENT.
530
LOAD SUB-SET OF ALTERNATIVES THAT MEET ALL REQUIREMENTS FROM DB2
531
LOAD ALL WEIGHTED CRITERIA FROM USERS RECORD. CRITERIA CALCULATED USING AHP
532
SYNTHESIZE WEIGHTS. APPLY AHP.
533
DECISION OUTPUT
534
SAVE PRIORITY TO EXISTING USER'S RECORD
535
DISPLAY CHOICE NEW GRAPH/ QUIT
NEW GRAPH
QUIT
536
"HOME"

FIG.5B

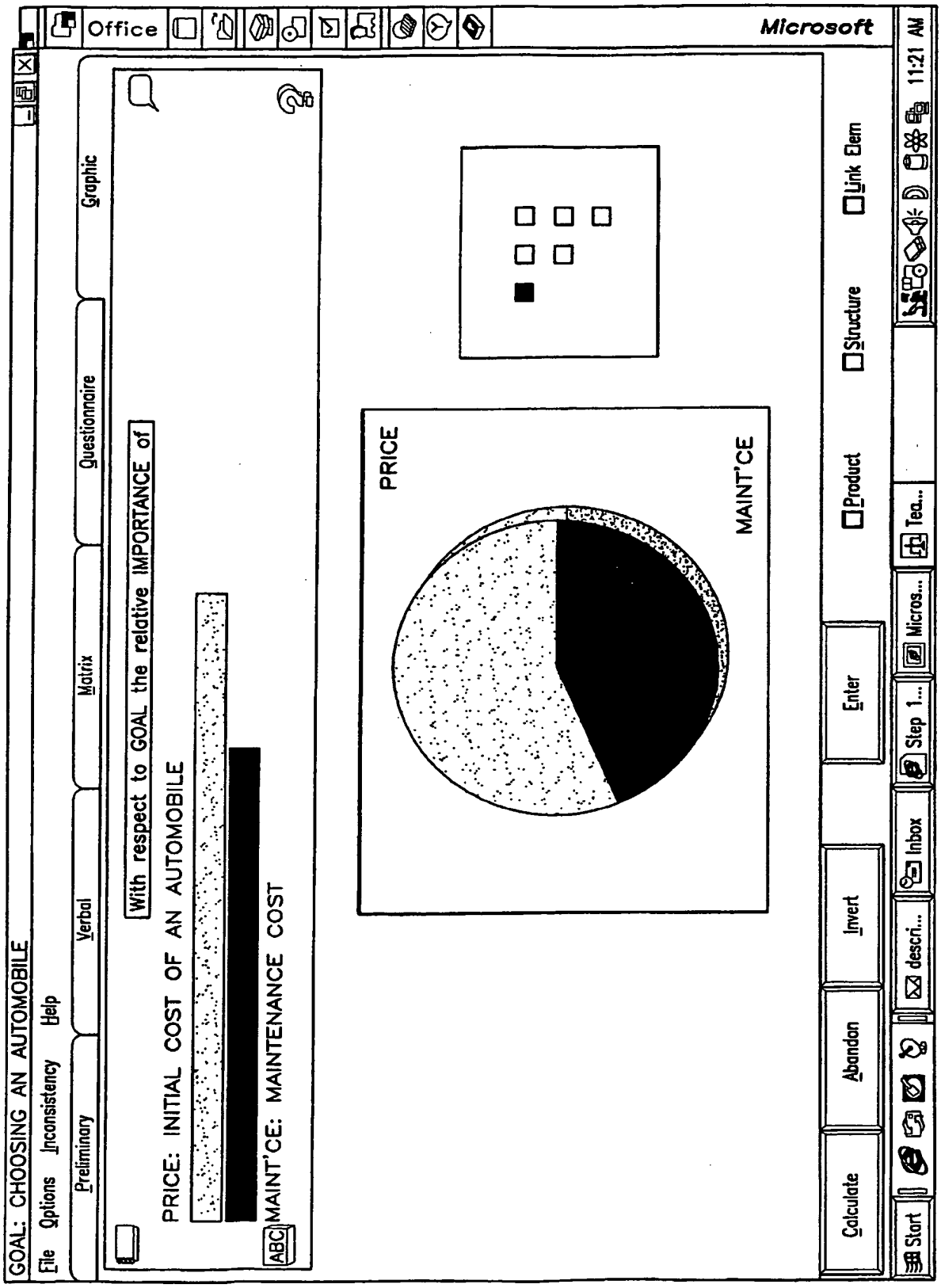

Office
Microsoft
GOAL: CHOOSING AN AUTOMOBILE
File Options Inconsistency Help
Preliminary
Verbal
Matrix
Questionnaire
Graphic
With respect to GOAL the relative IMPORTANCE of
PRICE: INITIAL COST OF AN AUTOMOBILE
ABC MAINT'CE: MAINTENANCE COST
PRICE
MAINT'CE
Product
Structure
Link Elem
Calculate
Abandon
Invert
Enter
Start
descri...
Inbox
Step 1...
Micros...
Tea...
11:21 AM

FIG.6

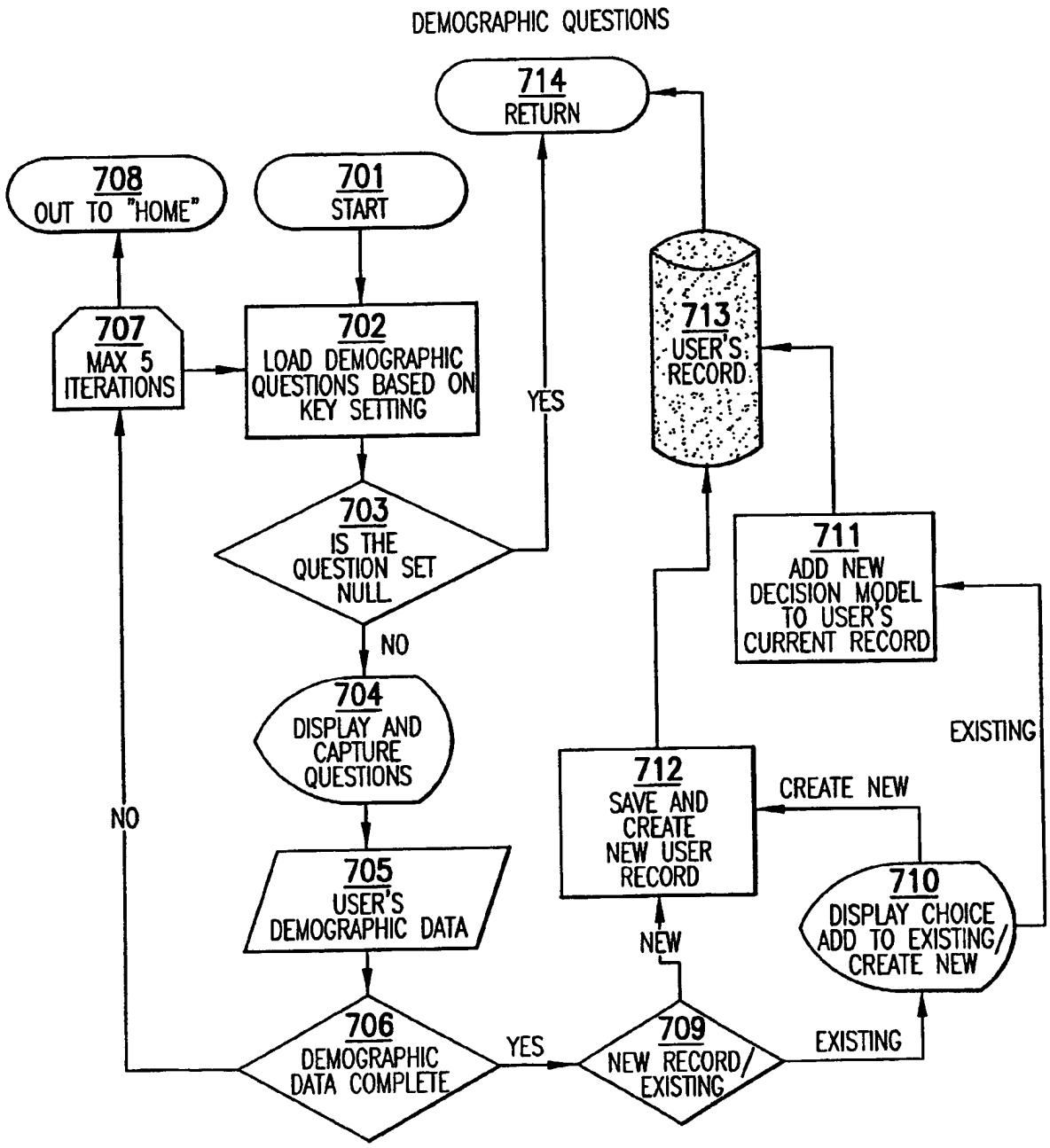

DEMOGRAPHIC QUESTIONS
714
RETURN
708
OUT TO "HOME"
701
START
713
USER'S RECORD
707
MAX 5 ITERATIONS
702
LOAD DEMOGRAPHIC QUESTIONS BASED ON KEY SETTING
YES
703
IS THE QUESTION SET NULL
711
ADD NEW DECISION MODEL TO USER'S CURRENT RECORD
NO
704
DISPLAY AND CAPTURE QUESTIONS
EXISTING
712
SAVE AND CREATE NEW USER RECORD
CREATE NEW
NO
705
USER'S DEMOGRAPHIC DATA
710
DISPLAY CHOICE ADD TO EXISTING/ CREATE NEW
NEW
706
DEMOGRAPHIC DATA COMPLETE
YES
709
NEW RECORD/ EXISTING
EXISTING

FIG.7

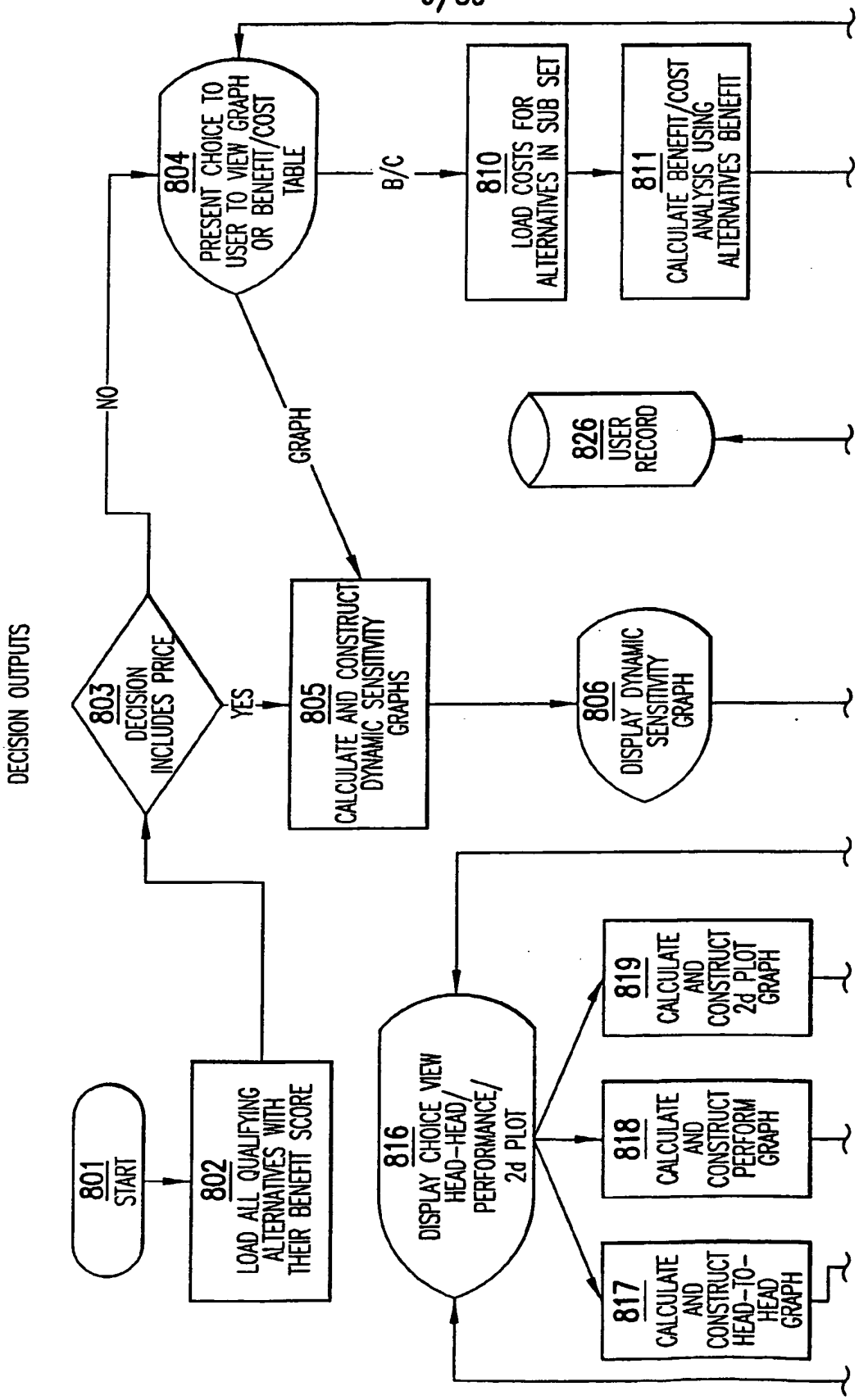

801 START
802 LOAD ALL QUALIFYING ALTERNATIVES WITH THEIR BENEFIT SCORE
803 DECISION INCLUDES PRICE
YES
NO
804 PRESENT CHOICE TO USER TO VIEW GRAPH OR BENEFIT/COST TABLE
B/C
GRAPH
805 CALCULATE AND CONSTRUCT DYNAMIC SENSITIVITY GRAPHS
806 DISPLAY DYNAMIC SENSITIVITY GRAPH
810 LOAD COSTS FOR ALTERNATIVES IN SUB SET
811 CALCULATE BENEFIT/COST ANALYSIS USING ALTERNATIVES BENEFIT
826 USER RECORD
816 DISPLAY CHOICE VIEW HEAD-HEAD/ PERFORMANCE/ 2d PLOT
817 CALCULATE AND CONSTRUCT HEAD-TO-HEAD GRAPH
818 CALCULATE AND CONSTRUCT PERFORM GRAPH
819 CALCULATE AND CONSTRUCT 2d PLOT GRAPH
DECISION OUTPUTS

FIG.8A

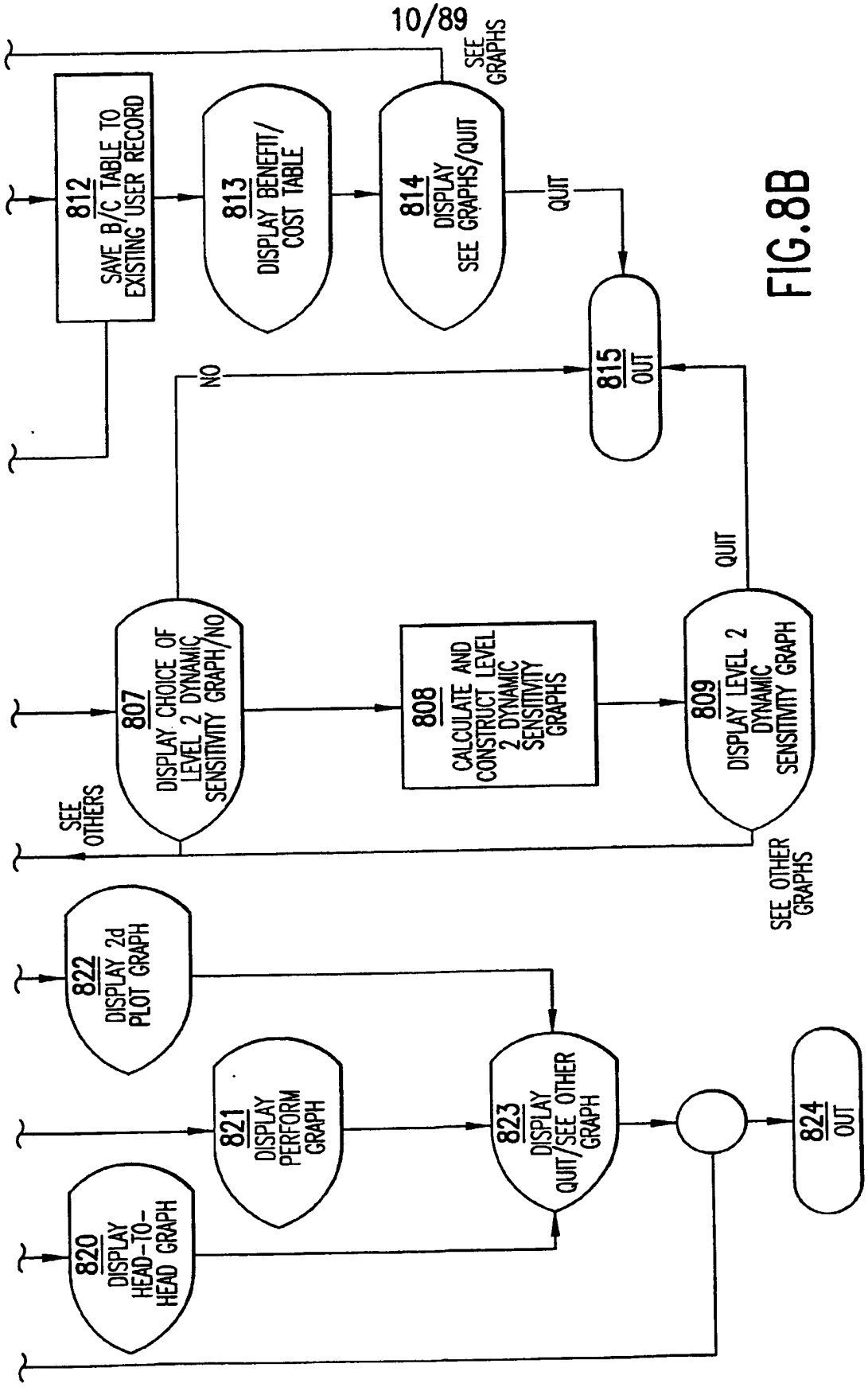

812 SAVE B/C TABLE TO EXISTING USER RECORD
813 DISPLAY BENEFIT/ COST TABLE
814 DISPLAY SEE GRAPHS/QUIT
SEE GRAPHS
QUIT
815 OUT
NO
807 DISPLAY CHOICE OF LEVEL 2 DYNAMIC SENSITIVITY GRAPH/NO
808 CALCULATE AND CONSTRUCT LEVEL 2 DYNAMIC SENSITIVITY GRAPHS
809 DISPLAY LEVEL 2 DYNAMIC SENSITIVITY GRAPH
QUIT
SEE OTHERS
SEE OTHER GRAPHS
822 DISPLAY 2d PLOT GRAPH
821 DISPLAY PERFORM GRAPH
820 DISPLAY HEAD-TO-HEAD GRAPH
823 DISPLAY QUIT/SEE OTHER GRAPH
824 OUT

FIG.8B

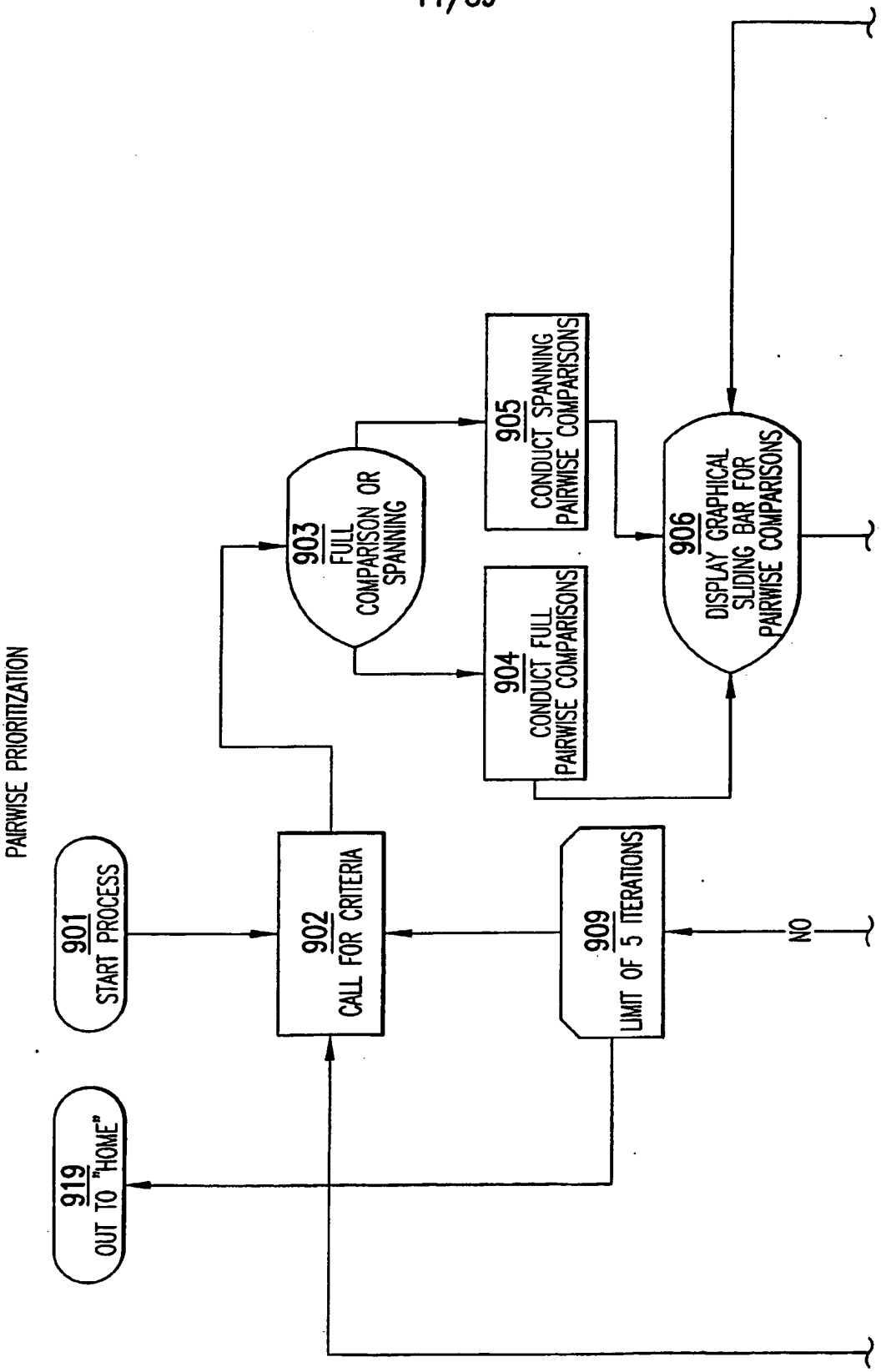

PAIRWISE PRIORITIZATION
901 START PROCESS
902 CALL FOR CRITERIA
903 FULL COMPARISON OR SPANNING
904 CONDUCT FULL PAIRWISE COMPARISONS
905 CONDUCT SPANNING PAIRWISE COMPARISONS
906 DISPLAY GRAPHICAL SLIDING BAR FOR PAIRWISE COMPARISONS
909 LIMIT OF 5 ITERATIONS
NO
919 OUT TO "HOME"

FIG.9A

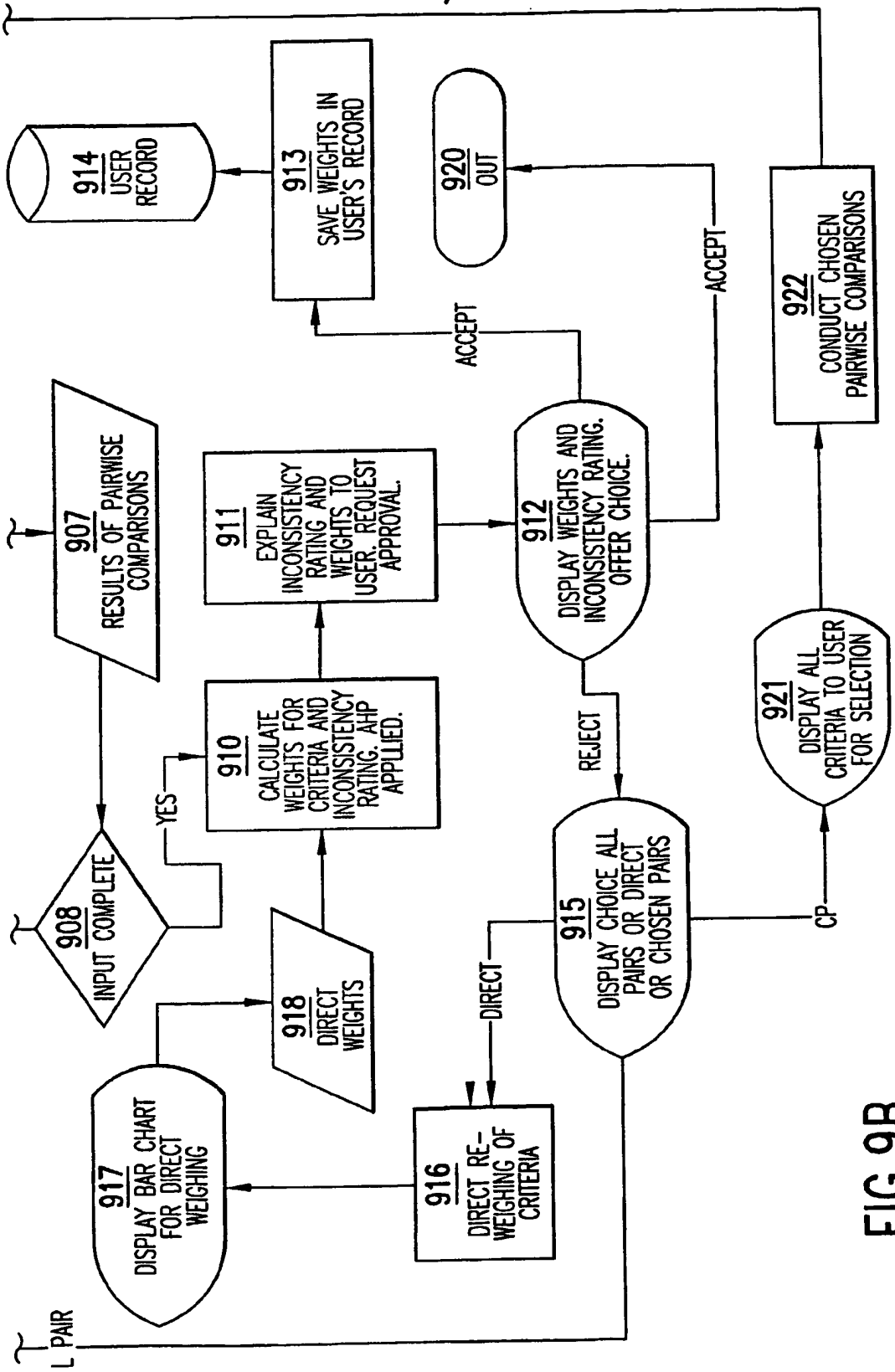

914 USER RECORD
913 SAVE WEIGHTS IN USER'S RECORD
920 OUT
922 CONDUCT CHOSEN PAIRWISE COMPARISONS
907 RESULTS OF PAIRWISE COMPARISONS
911 EXPLAIN INCONSISTENCY RATING AND WEIGHTS TO USER. REQUEST APPROVAL.
912 DISPLAY WEIGHTS AND INCONSISTENCY RATING. OFFER CHOICE.
910 CALCULATE WEIGHTS FOR CRITERIA AND INCONSISTENCY RATING. AHP APPLIED.
921 DISPLAY ALL CRITERIA TO USER FOR SELECTION
908 INPUT COMPLETE
918 DIRECT WEIGHTS
915 DISPLAY CHOICE ALL PAIRS OR DIRECT OR CHOSEN PAIRS
917 DISPLAY BAR CHART FOR DIRECT WEIGHING
916 DIRECT RE-WEIGHING OF CRITERIA
L PAIR
ACCEPT
ACCEPT
YES
REJECT
DIRECT
CP

FIG.9B

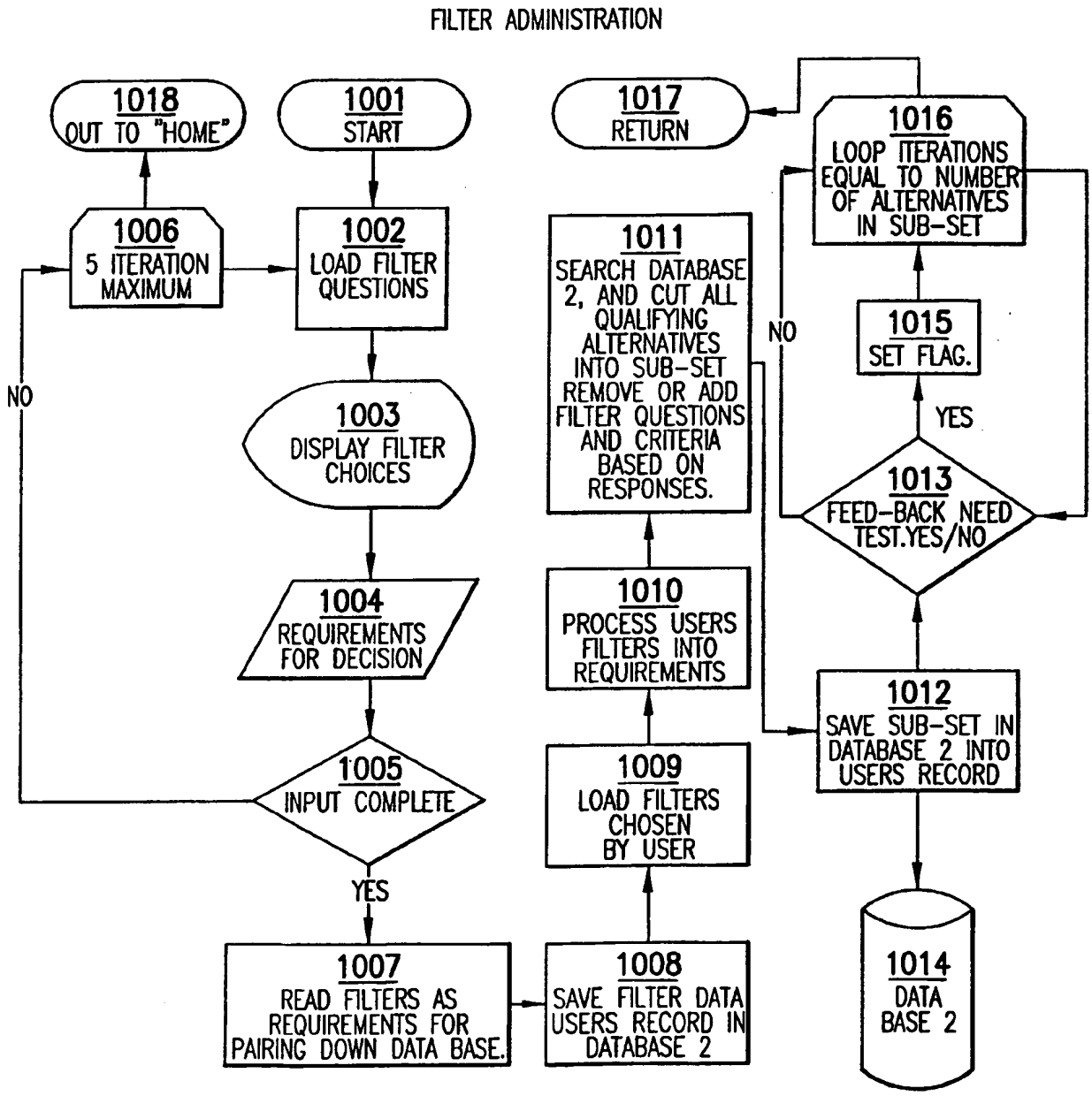

FILTER ADMINISTRATION
1018
OUT TO "HOME"
1001
START
1017
RETURN
1016
LOOP ITERATIONS EQUAL TO NUMBER OF ALTERNATIVES IN SUB-SET
1006
5 ITERATION MAXIMUM
1002
LOAD FILTER QUESTIONS
1011
SEARCH DATABASE 2, AND CUT ALL QUALIFYING ALTERNATIVES INTO SUB-SET REMOVE OR ADD FILTER QUESTIONS AND CRITERIA BASED ON RESPONSES.
NO
1015
SET FLAG.
YES
NO
1003
DISPLAY FILTER CHOICES
1013
FEED-BACK NEED TEST.YES/NO
1004
REQUIREMENTS FOR DECISION
1010
PROCESS USERS FILTERS INTO REQUIREMENTS
1012
SAVE SUB-SET IN DATABASE 2 INTO USERS RECORD
1005
INPUT COMPLETE
1009
LOAD FILTERS CHOSEN BY USER
YES
1007
READ FILTERS AS REQUIREMENTS FOR PAIRING DOWN DATA BASE.
1008
SAVE FILTER DATA USERS RECORD IN DATABASE 2
1014
DATA BASE 2

FIG.10

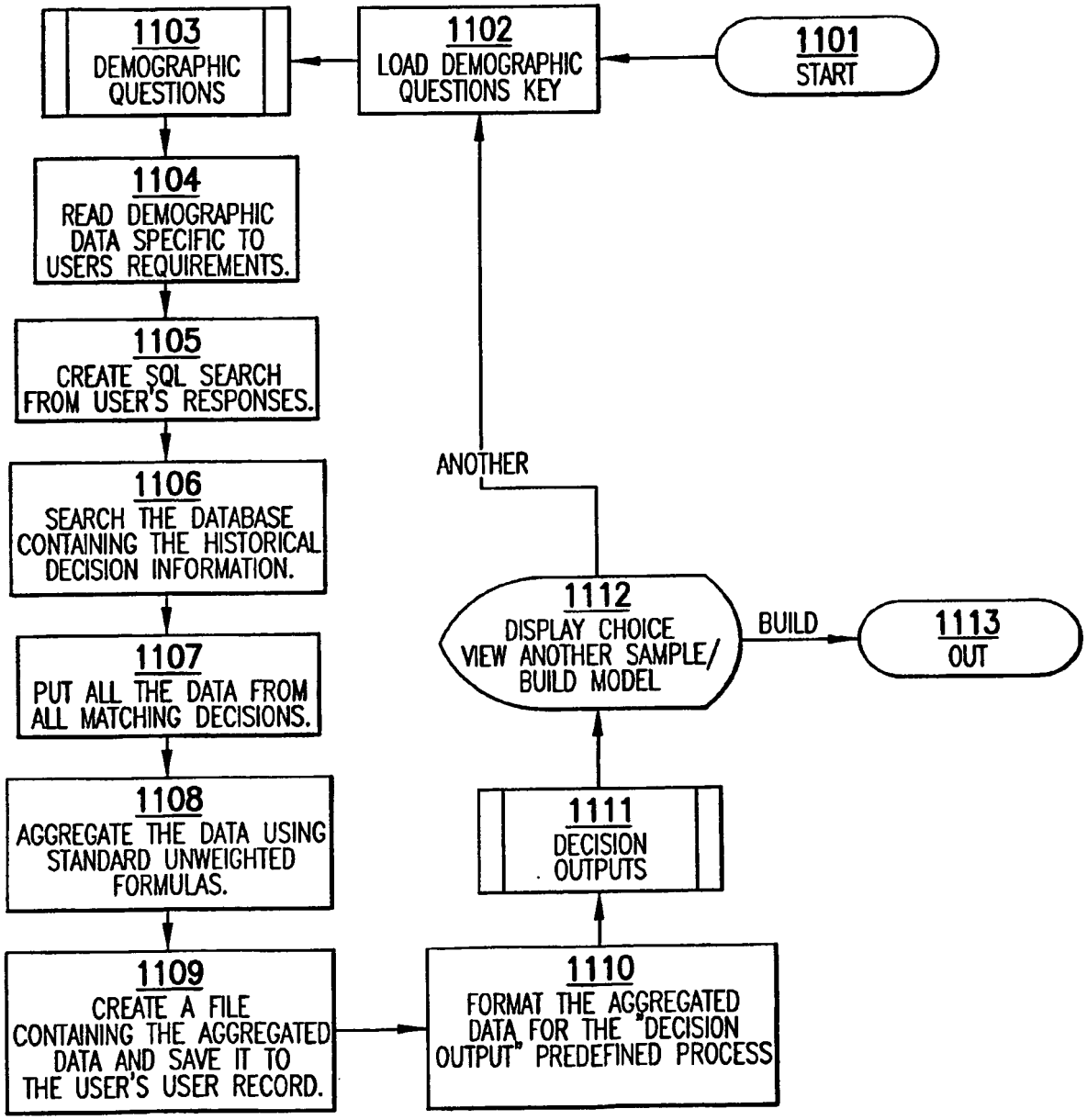

1101
START
1102
LOAD DEMOGRAPHIC QUESTIONS KEY
1103
DEMOGRAPHIC QUESTIONS
1104
READ DEMOGRAPHIC DATA SPECIFIC TO USERS REQUIREMENTS.
1105
CREATE SQL SEARCH FROM USER'S RESPONSES.
1106
SEARCH THE DATABASE CONTAINING THE HISTORICAL DECISION INFORMATION.
1107
PUT ALL THE DATA FROM ALL MATCHING DECISIONS.
1108
AGGREGATE THE DATA USING STANDARD UNWEIGHTED FORMULAS.
1109
CREATE A FILE CONTAINING THE AGGREGATED DATA AND SAVE IT TO THE USER'S USER RECORD.
1110
FORMAT THE AGGREGATED DATA FOR THE "DECISION OUTPUT" PREDEFINED PROCESS
1111
DECISION OUTPUTS
1112
DISPLAY CHOICE VIEW ANOTHER SAMPLE/ BUILD MODEL
ANOTHER
BUILD
1113
OUT

FIG.11

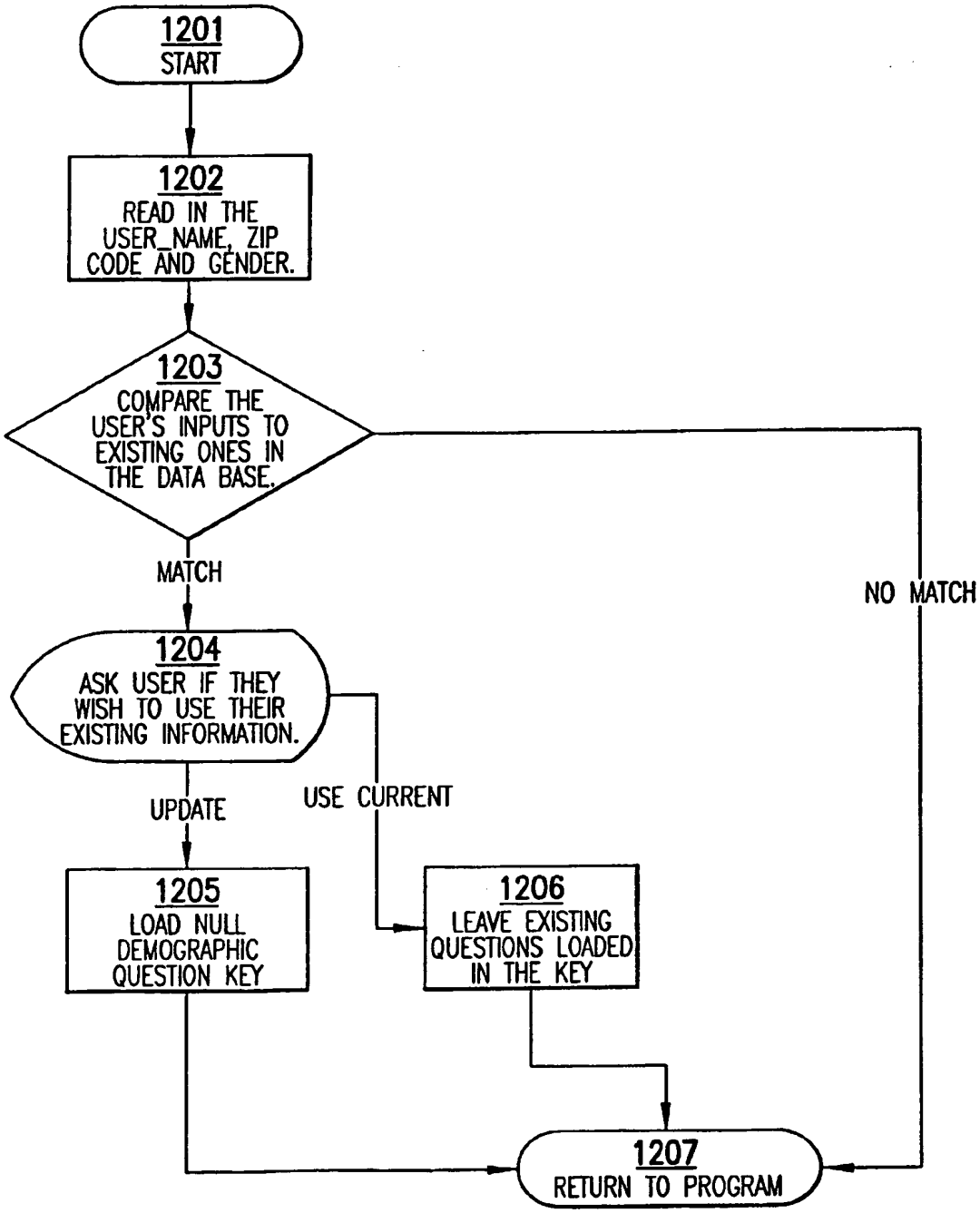

1201
START
1202
READ IN THE USER_NAME, ZIP CODE AND GENDER.
1203
COMPARE THE USER'S INPUTS TO EXISTING ONES IN THE DATA BASE.
MATCH
NO MATCH
1204
ASK USER IF THEY WISH TO USE THEIR EXISTING INFORMATION.
UPDATE
USE CURRENT
1205
LOAD NULL DEMOGRAPHIC QUESTION KEY
1206
LEAVE EXISTING QUESTIONS LOADED IN THE KEY
1207
RETURN TO PROGRAM

FIG.12

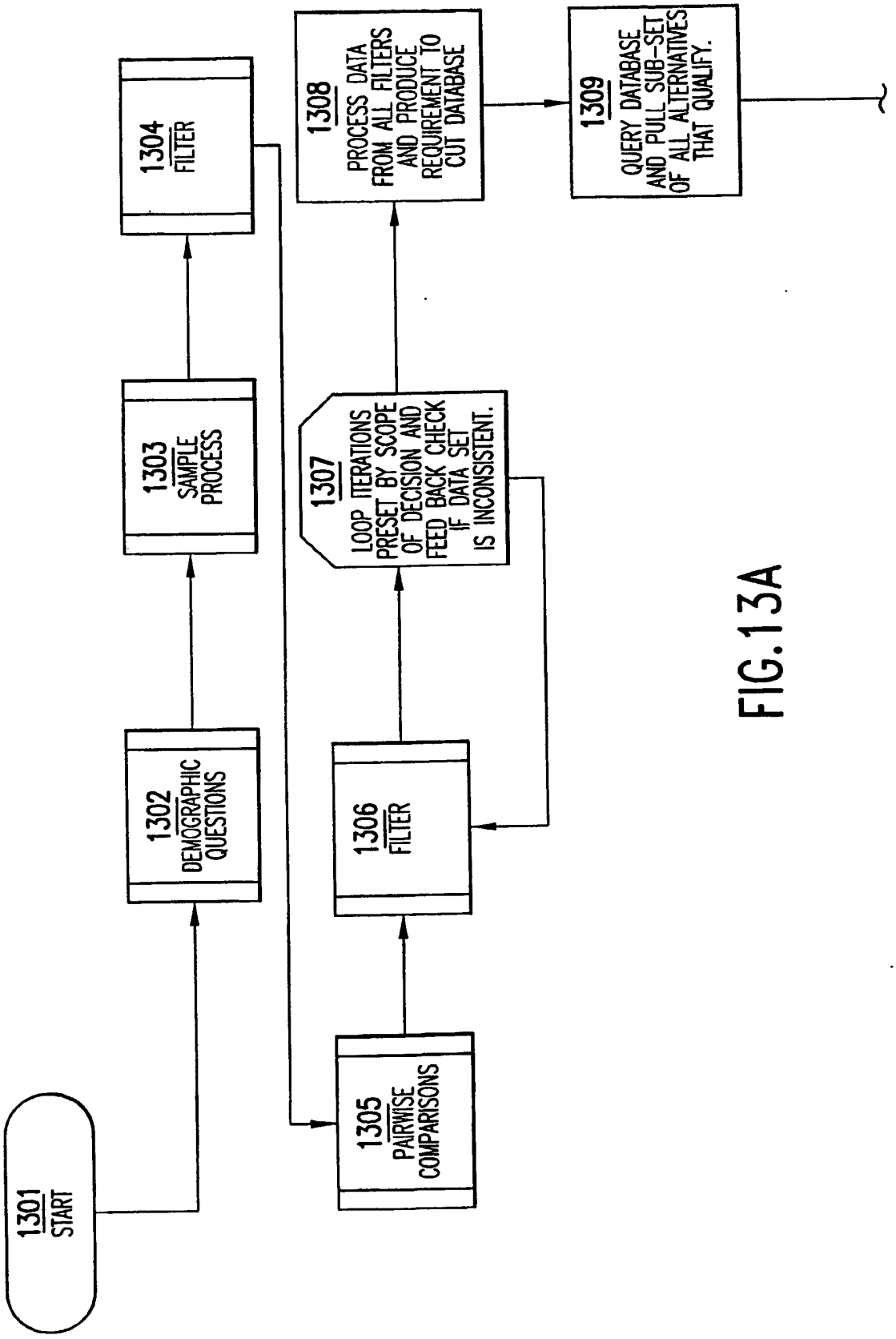

1301 START
1302 DEMOGRAPHIC QUESTIONS
1303 SAMPLE PROCESS
1304 FILTER
1305 PAIRWISE COMPARISONS
1306 FILTER
1307 LOOP ITERATIONS PRESET BY SCOPE OF DECISION AND FEED BACK CHECK IF DATA SET IS INCONSISTENT.
1308 PROCESS DATA FROM ALL FILTERS AND PRODUCE REQUIREMENT TO CUT DATABASE
1309 QUERY DATABASE AND PULL SUB-SET OF ALL ALTERNATIVES THAT QUALIFY.

FIG.13A

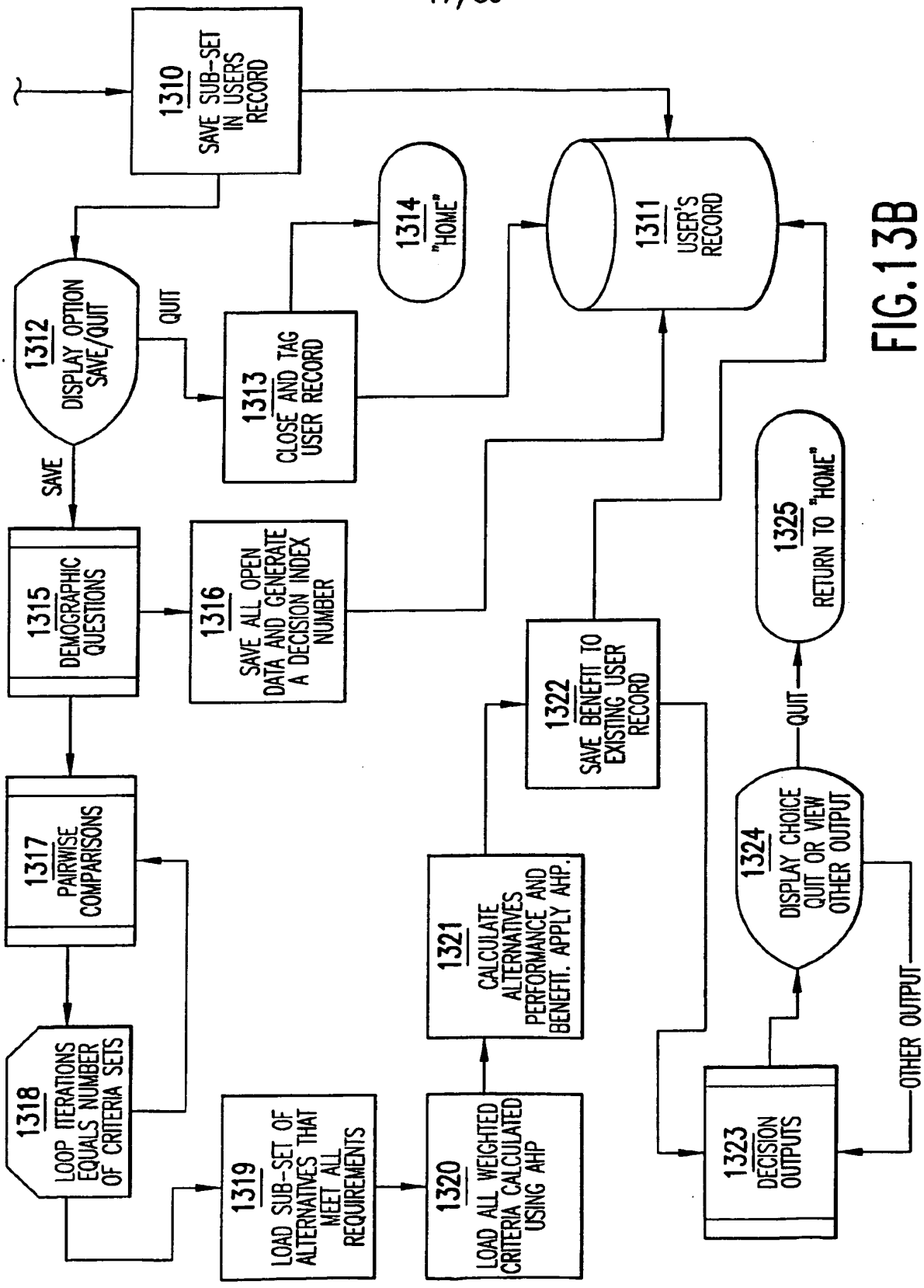

1310 SAVE SUB-SET IN USERS RECORD
1311 USER'S RECORD
1312 DISPLAY OPTION SAVE/QUIT
QUIT
SAVE
1313 CLOSE AND TAG USER RECORD
1314 "HOME"
1315 DEMOGRAPHIC QUESTIONS
1316 SAVE ALL OPEN DATA AND GENERATE A DECISION INDEX NUMBER
1317 PAIRWISE COMPARISONS
1318 LOOP ITERATIONS EQUALS NUMBER OF CRITERIA SETS
1319 LOAD SUB-SET OF ALTERNATIVES THAT MEET ALL REQUIREMENTS
1320 LOAD ALL WEIGHTED CRITERIA CALCULATED USING AHP
1321 CALCULATE ALTERNATIVES PERFORMANCE AND BENEFIT. APPLY AHP.
1322 SAVE BENEFIT TO EXISTING USER RECORD
1323 DECISION OUTPUTS
1324 DISPLAY CHOICE QUIT OR VIEW OTHER OUTPUT
QUIT
1325 RETURN TO "HOME"
OTHER OUTPUT

FIG.13B

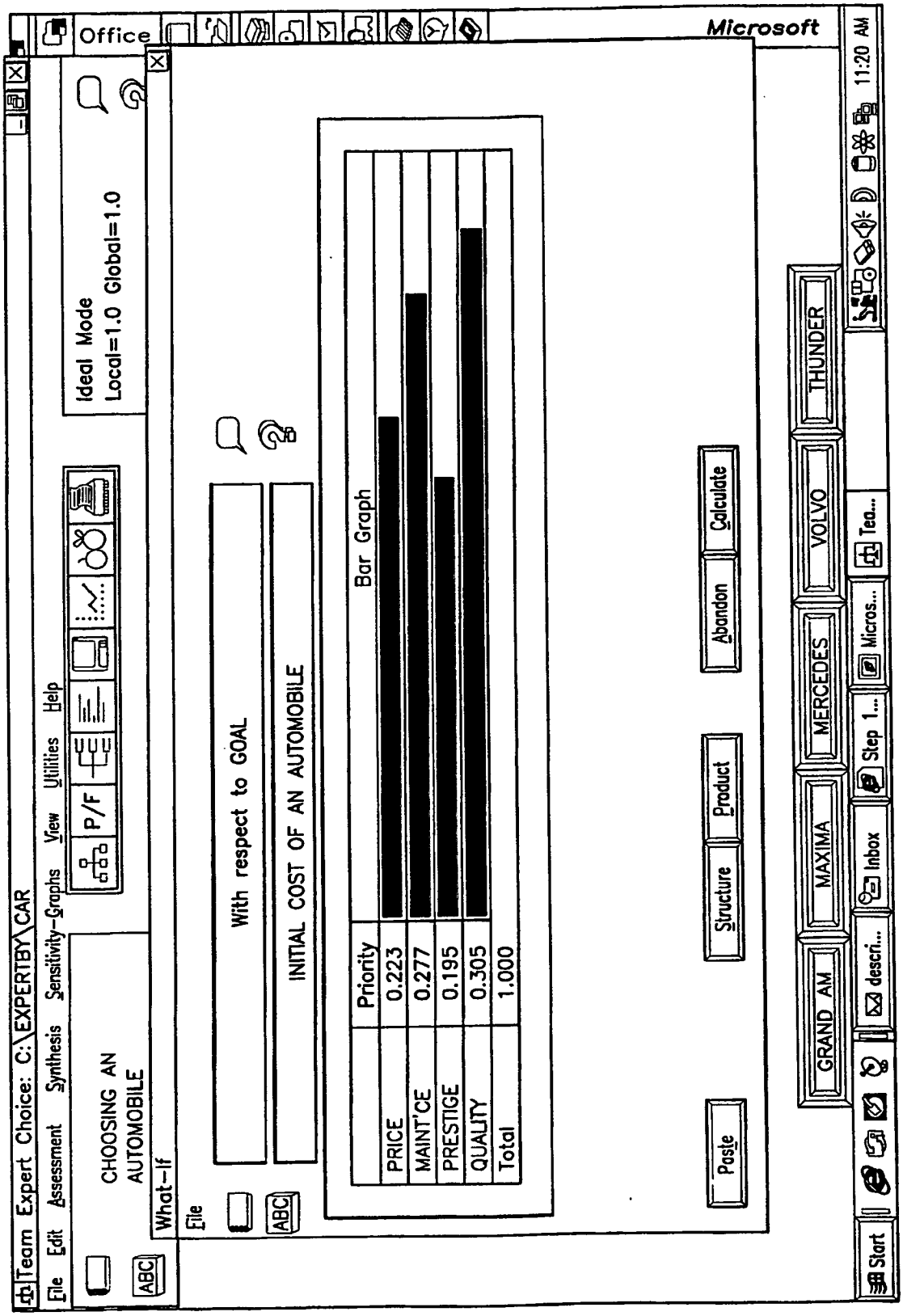

Team Expert Choice: C:\EXPERTBY\CAR
File Edit Assessment Synthesis Sensitivity-Graphs View Utilities Help
Office
Microsoft
P/F
Ideal Mode
Local=1.0 Global=1.0
CHOOSING AN AUTOMOBILE
What-if
File
With respect to GOAL
INITIAL COST OF AN AUTOMOBILE
Bar Graph
Priority
PRICE 0.223
MAINT'CE 0.277
PRESTIGE 0.195
QUALITY 0.305
Total 1.000
Structure
Product
Abandon
Calculate
Paste
GRAND AM
MAXIMA
MERCEDES
VOLVO
THUNDER
Start
descri...
Inbox
Step 1...
Micros...
Tea...
11:20 AM

FIG.14

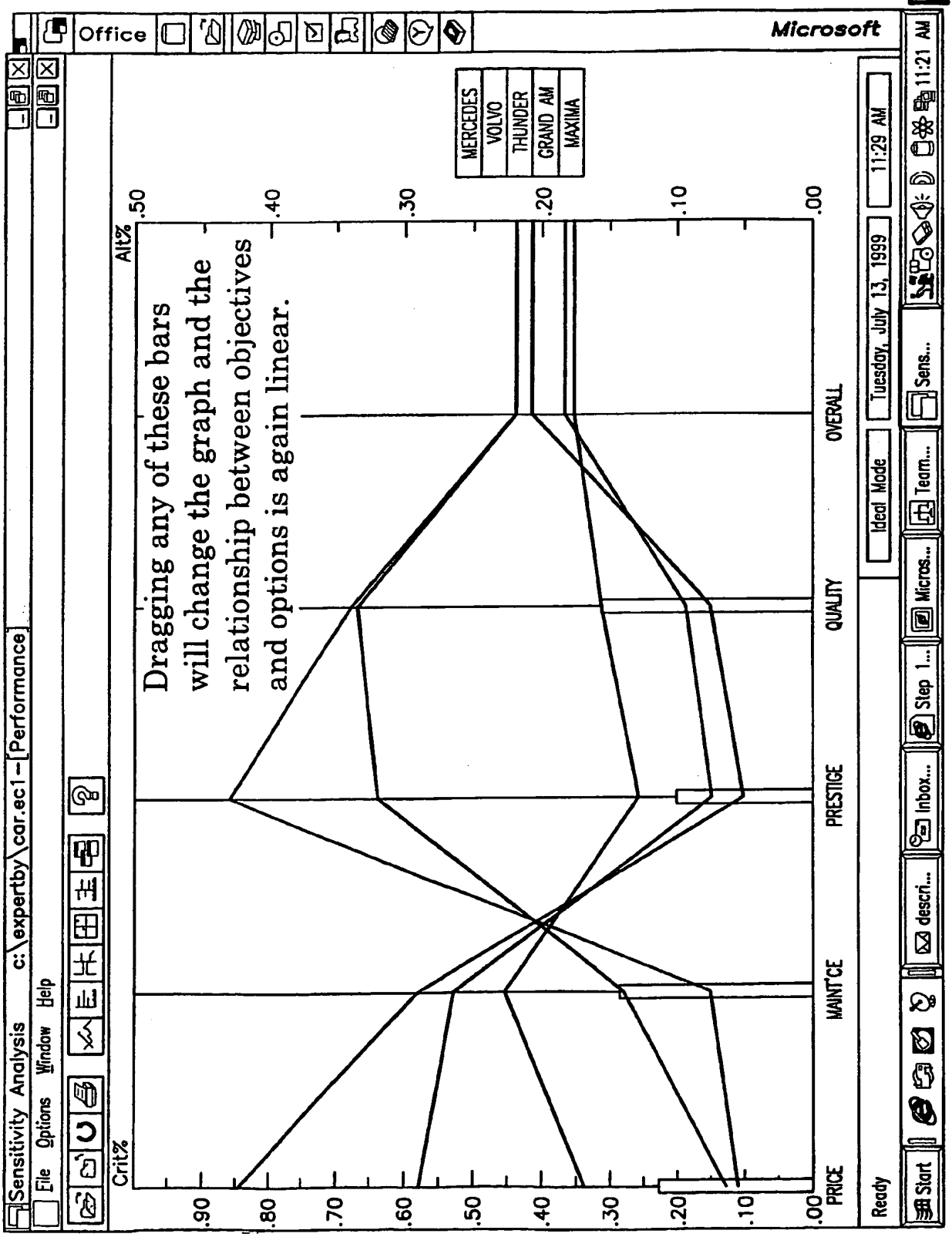

Sensitivity Analysis c:\expertby\car.ec1 - [Performance]
File Options Window Help
Office
Microsoft
Crit%
Alt%
.50
.40
.30
.20
.10
.00
.90
.80
.70
.60
.50
.40
.30
.20
.10
.00
PRICE
MAINT'CE
PRESTIGE
QUALITY
OVERALL
MERCEDES
VOLVO
THUNDER
GRAND AM
MAXIMA
Dragging any of these bars will change the graph and the relationship between objectives and options is again linear.
Ready
Ideal Mode
Tuesday, July 13, 1999
11:29 AM
11:21 AM
Start
descri...
Inbox...
Step 1...
Micros...
Team...
Sens...

FIG.15

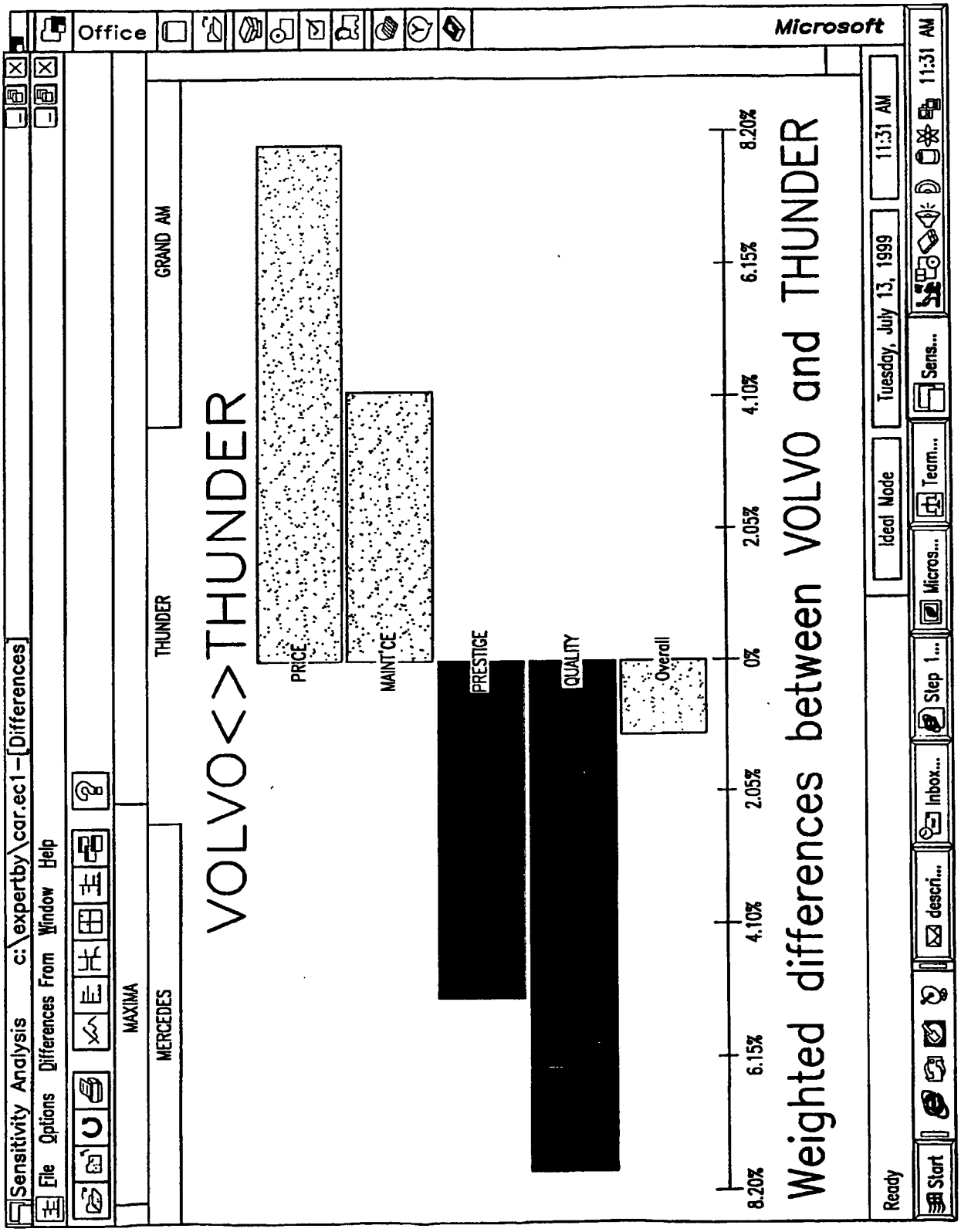

Sensitivity Analysis c:\expertby\car.ec1-[Differences]
File Options Differences From Window Help
Office
Microsoft
MERCEDES
MAXIMA
THUNDER
GRAND AM
VOLVO<>THUNDER
PRICE
MAINT'CE
PRESTIGE
QUALITY
Overall
8.20%
6.15%
4.10%
2.05%
0%
2.05%
4.10%
6.15%
8.20%
Weighted differences between VOLVO and THUNDER
Ready
Ideal Mode
Tuesday, July 13, 1999
11:31 AM
Start
Inbox...
descri...
Step 1...
Micros...
Team...
Sens...
11:31 AM

FIG.16

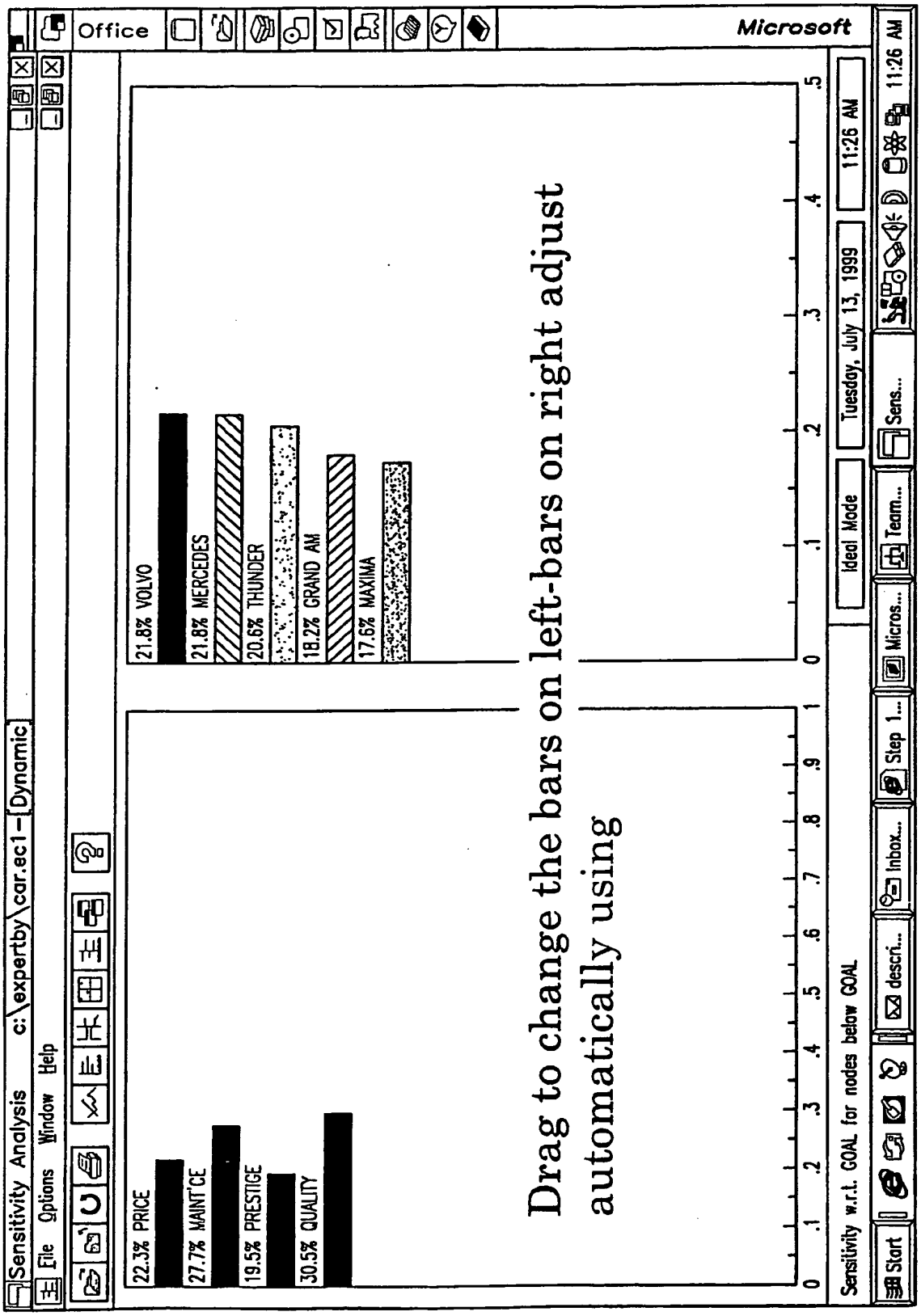

Sensitivity Analysis c:\expertby\car.ec1 – Dynamic
File Options Window Help
Office
Microsoft
Drag to change the bars on left-bars on right adjust automatically using
22.3% PRICE
27.7% MAINT'CE
19.5% PRESTIGE
30.5% QUALITY
21.8% VOLVO
21.8% MERCEDES
20.6% THUNDER
18.2% GRAND AM
17.6% MAXIMA
0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1
0 .1 .2 .3 .4 .5
Sensitivity w.r.t. GOAL for nodes below GOAL
Ideal Mode
Tuesday, July 13, 1999
11:26 AM
Start
descri...
Inbox...
Step 1...
Micros...
Team...
Sens...
11:26 AM

FIG.17

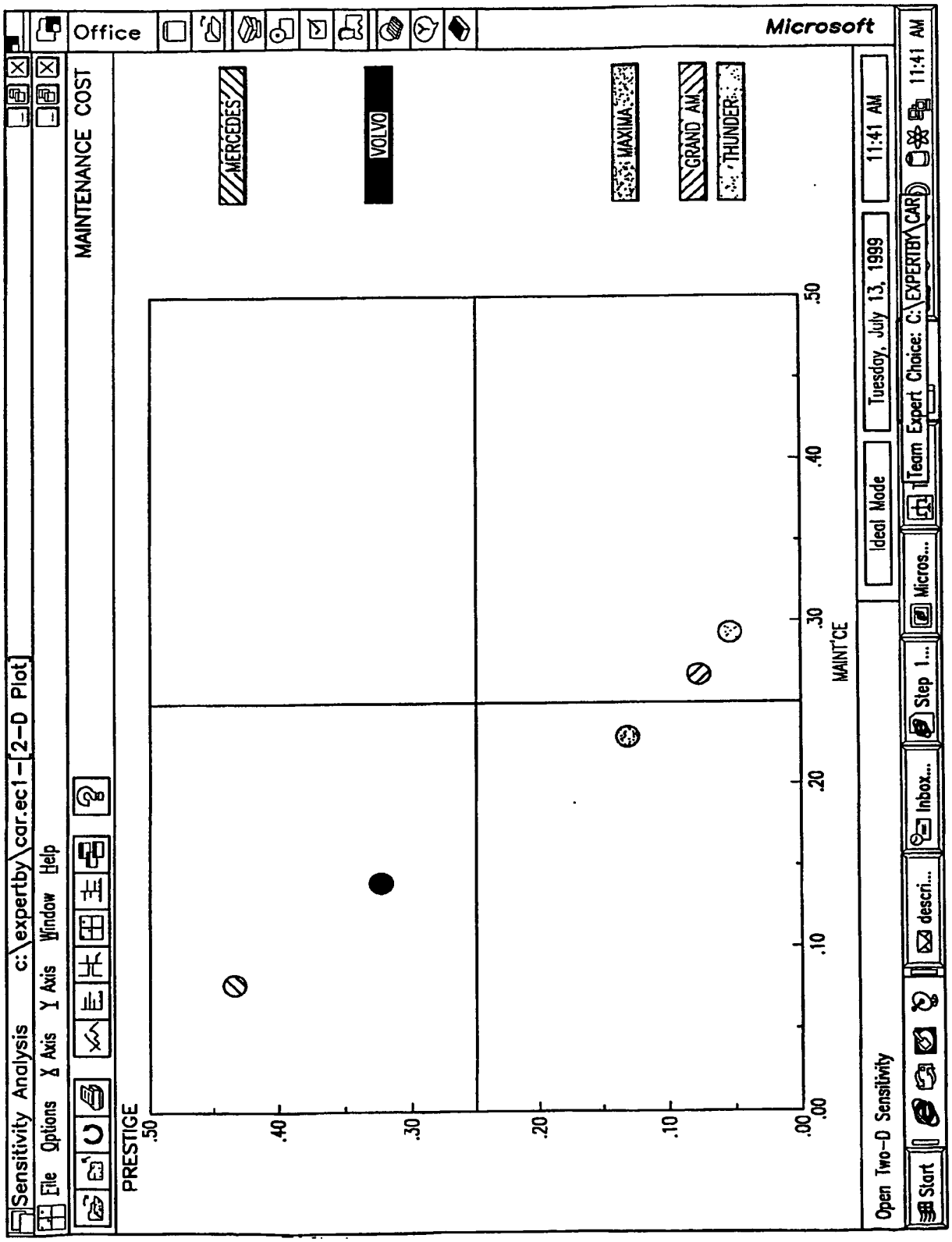

Sensitivity Analysis c:\expertby\car.ec1-[2-D Plot]
File Options X Axis Y Axis Window Help
Office
Microsoft
MAINTENANCE COST
MERCEDES
VOLVO
MAXIMA
GRAND AM
THUNDER
PRESTIGE
.50
.40
.30
.20
.10
.00
.00
.10
.20
.30
.40
.50
MAINTCE
Ideal Mode
Tuesday, July 13, 1999
11:41 AM
Team Expert Choice: C:\EXPERTBY\CAR
Open Two-D Sensitivity
Start
descri...
Inbox...
Step 1...
Micros...
11:41 AM

FIG.18

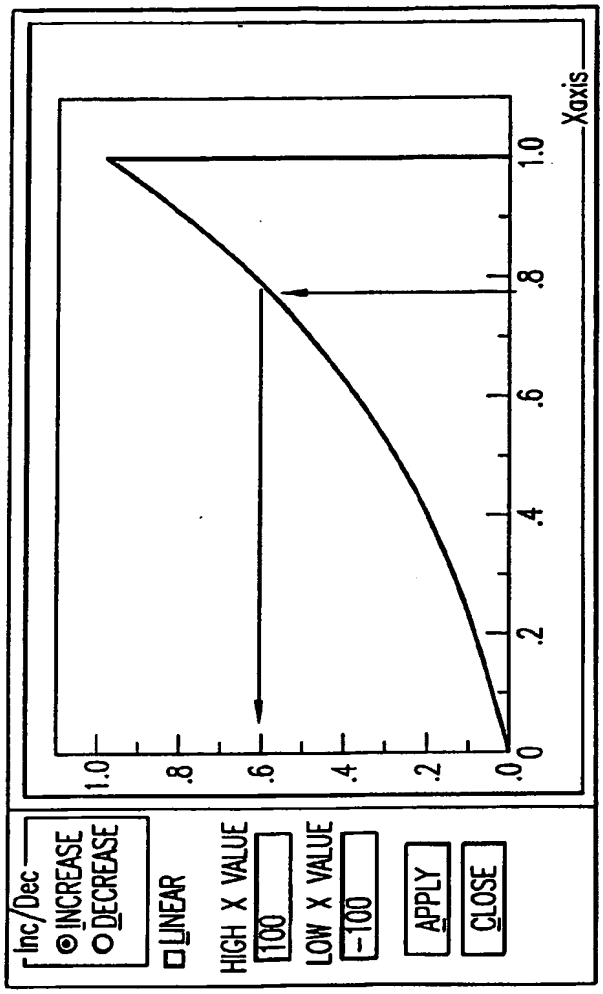

Inc/Dec
INCREASE
DECREASE
LINEAR
HIGH X VALUE
100
LOW X VALUE
-100
APPLY
CLOSE
1.0
.8
.6
.4
.2
.0
Xaxis

FIG.19

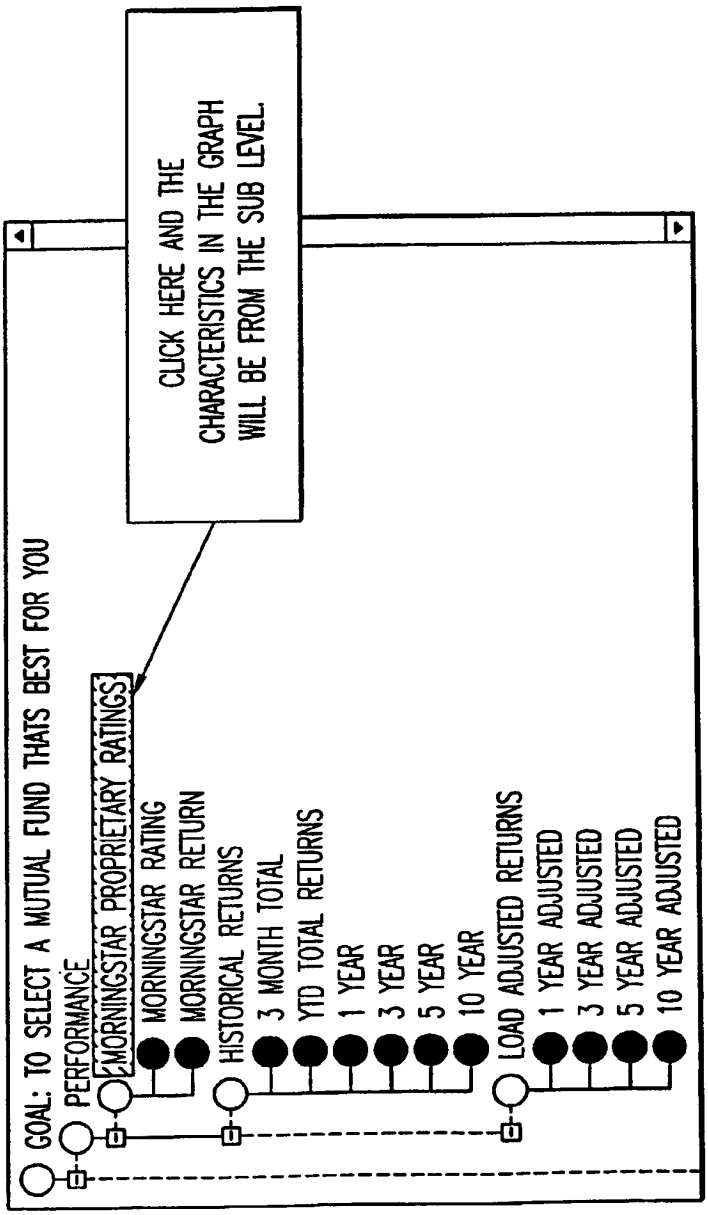
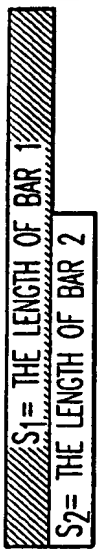

CLICK HERE AND THE CHARACTERISTICS IN THE GRAPH WILL BE FROM THE SUB LEVEL
GOAL: TO SELECT A MUTUAL FUND THATS BEST FOR YOU
PERFORMANCE
MORNINGSTAR PROPRIETARY RATINGS
MORNINGSTAR RATING
MORNINGSTAR RETURN
HISTORICAL RETURNS
3 MONTH TOTAL
YTD TOTAL RETURNS
1 YEAR
3 YEAR
5 YEAR
10 YEAR
LOAD ADJUSTED RETURNS
1 YEAR ADJUSTED
3 YEAR ADJUSTED
5 YEAR ADJUSTED
10 YEAR ADJUSTED

FIG.20



$S_{11}/S_{21}=A_{11,21}$

WITH A BEING THE RATIO OF THE FIRST INSTANCE OF S_1 TO THE FIRST INSTANCE OF S_2

FIG.21A

MATRIX OF COMPARISONS	OBJECTIVE A	OBJECTIVE B	OBJECTIVE C	OBJECTIVE *N*	RESULTING PRIORITY EIGENVECTOR
OBJECTIVE A	$A_{11,11}$	$A_{12,21}$	$A_{13,31}$	$A_{1n,nn}$	NORMALIZED EIGENVECTOR OF A = PE_A
OBJECTIVE B	$A_{21,12}$	$A_{22,22}$	$A_{23,32}$	$A_{2n,nn}$	NORMALIZED EIGENVECTOR OF A = PE_B
OBJECTIVE C	$A_{31,13}$	$A_{32,23}$	$A_{33,33}$	$A_{3n,nn}$	NORMALIZED EIGENVECTOR OF A = PE_C
OBJECTIVE *N*	$A_{nn,1n}$	$A_{nn,2n}$	$A_{nn,3n}$	$A_{nn,nn}$	NORMALIZED EIGENVECTOR OF A = PE_N

FIG.21B

MATRIX OF COMPARISONS	OBJECTIVE A	OBJECTIVE B	OBJECTIVE C	ROW SUMS	AVG. ROW SUM
OBJECTIVE A	$A_{11,11}$/SUM (COLUMN A)	$A_{12,21}$/SUM (COLUMN B)	$A_{13,31}$/SUM (COLUMN N)	SUM(ROW A) =ROW_1	$ROW_1/N = ARS_1$
OBJECTIVE B	$A_{21,12}$/SUM (COLUMN A)	$A_{22,22}$/SUM (COLUMN B)	$A_{23,32}$/SUM (COLUMN N)	SUM(ROW B) =ROW_2	$ROW_2/N = ARS_2$
OBJECTIVE C	$A_{33,11}$/SUM (COLUMN A)	$A_{32,23}$/SUM (COLUMN B)	$A_{33,33}$/SUM (COLUMN N)	SUM(ROW C) =ROW_3	$ROW_3/N = ARS_3$

MATRIX OF COMPARISONS	OBJECTIVE A	OBJECTIVE B	OBJECTIVE N	NORMALIZED ROW SUMS	PRIORITY VECTORS
OBJECTIVE A	$(A_{11,11})ARS_1$	$(A_{12,21})ARS_1$	$(A_{1n,Nn})ARS_1$	SUM(ROW A) =$NROW_1$	$NROW_1/ARS_1 = PV1$
OBJECTIVE B	$(A_{21,12})ARS_2$	$(A_{22,22})ARS_2$	$(A_{2n,Nn})ARS_2$	SUM(ROW B) =$NROW_2$	$NROW_2/ARS_2 = PV_2$
OBJECTIVE N	$(A_{Nn,1n})ARS_n$	$(A_{Nn,2n})ARS_n$	$(A_{Nn,Nn})ARS_n$	SUM(ROW N) =$NROW_n$	$NROW_3/ARS_3 = PV_n$

FIG.22

ABSOLUTE MEASUREMENT TABLE WITH RAW DATA	OBJECTIVE A	OBJECTIVE B	OBJECTIVE *N*
ALTERNATIVE ONE	RAW SCORE ONE-A	RAW SCORE ONE-B	RAW SCORE ONE-N
ALTERNATIVE TWO	RAW SCORE TWO-A	RAW SCORE TWO-B	RAW SCORE TWO-N
ALTERNATIVE THREE	RAW SCORE THREE-A	RAW SCORE THREE-B	RAW SCORE THREE-N

FIG.23

ABSOLUTE MEASUREMENT TABLE WITH SYNTHESIS DATA	OBJECTIVE A	OBJECTIVE B	OBJECTIVE *N*	COMPOSITE INPACT OF ALTERNATIVES
ALTERNATIVE ONE	(INTERSECTION OF ONE-A AND UTILITY CURVE) x (PE_A)	(INTERSECTION OF ONE-B AND UTILITY CURVE) x (PE_B)	(INTERSECTION OF ONE-N AND UTILITY CURVE) x (PE_N)	SUM (ROW ONE)
ALTERNATIVE TWO	(INTERSECTION OF TWO-A AND UTILITY CURVE) x (PE_A)	(INTERSECTION OF TWO-B AND UTILITY CURVE) x (PE_B)	(INTERSECTION OF TWO-N AND UTILITY CURVE) x (PE_N)	SUM (ROW TWO)
ALTERNATIVE THREE	(INTERSECTION OF THREE-A AND UTILITY CURVE) x (PE_N)	(INTERSECTION OF THREE-B AND UTILITY CURVE) x (PE_B)	(INTERSECTION OF THREE-N AND UTILITY CURVE) x (PE_N)	SUM (ROW THREE)

FIG.24

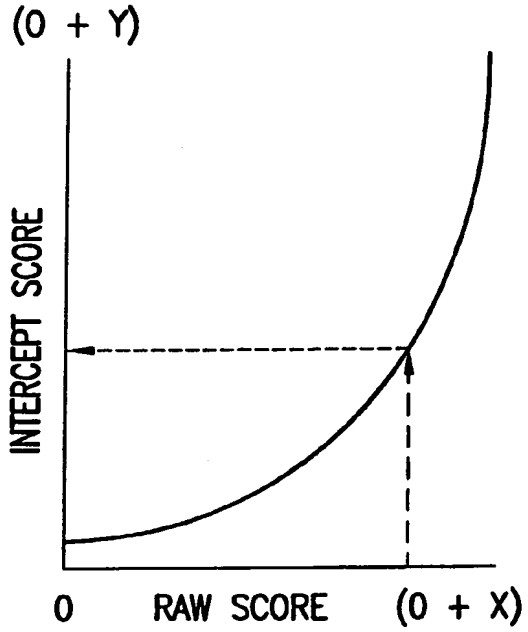

(0 + Y)
INTERCEPT SCORE
0
RAW SCORE
(0 + X)

FIG.25

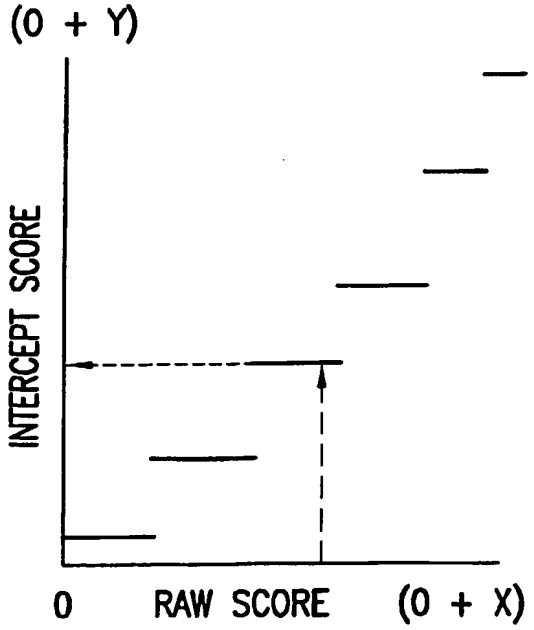

(0 + Y)
INTERCEPT SCORE
0
RAW SCORE
(0 + X)

FIG.26

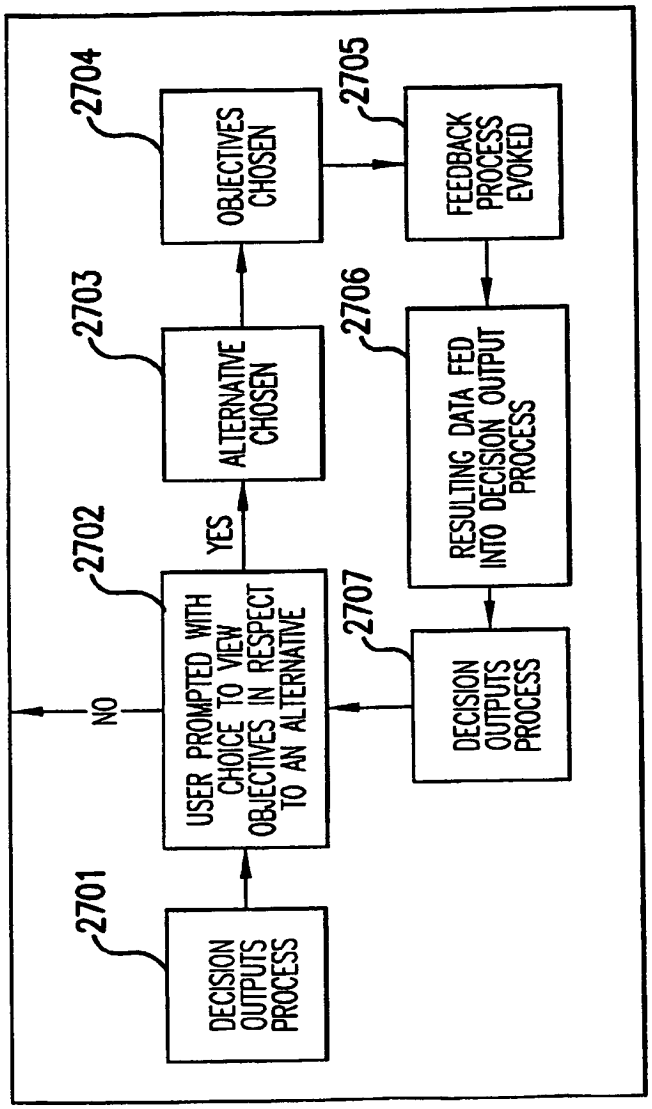

2701
DECISION OUTPUTS PROCESS
2702
USER PROMPTED WITH CHOICE TO VIEW OBJECTIVES IN RESPECT TO AN ALTERNATIVE
NO
YES
2703
ALTERNATIVE CHOSEN
2704
OBJECTIVES CHOSEN
2705
FEEDBACK PROCESS EVOKED
2706
RESULTING DATA FED INTO DECISION OUTPUT PROCESS
2707
DECISION OUTPUTS PROCESS

FIG.27

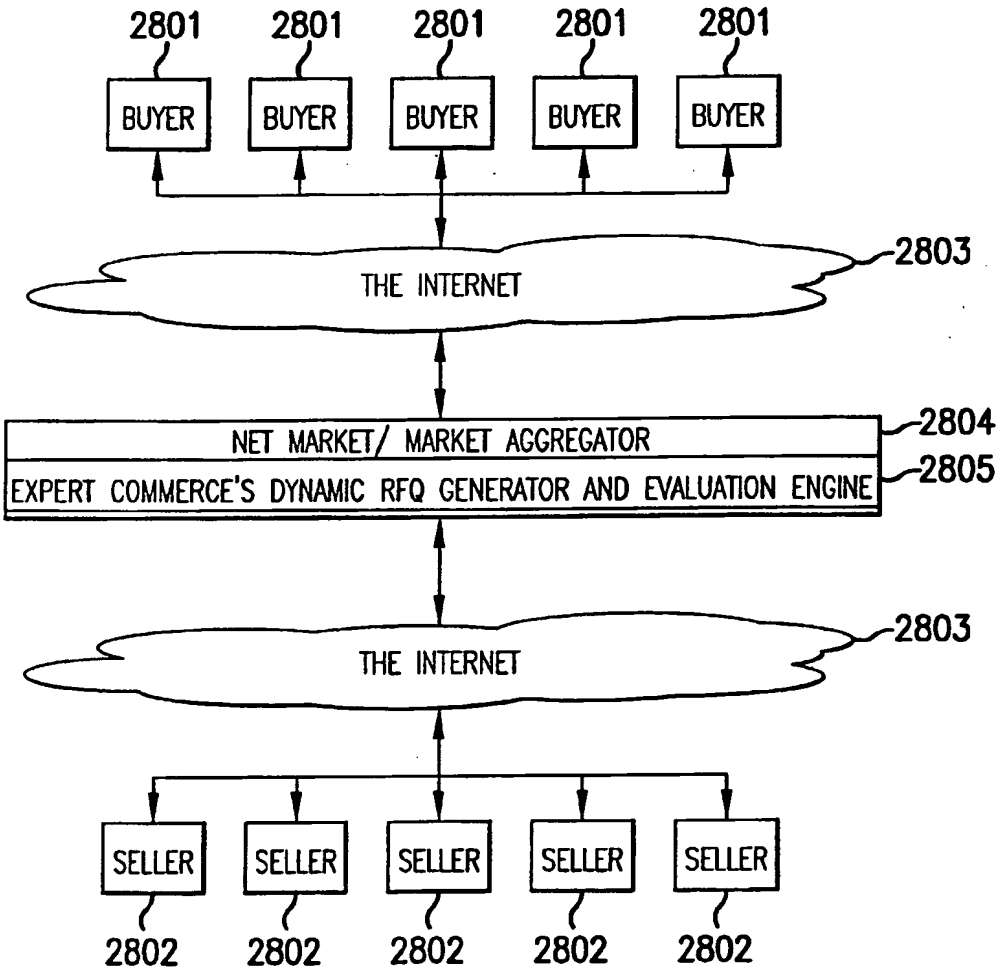

2801
2801
2801
2801
2801
BUYER
BUYER
BUYER
BUYER
BUYER
THE INTERNET
2803
NET MARKET/ MARKET AGGREGATOR
2804
EXPERT COMMERCE'S DYNAMIC RFQ GENERATOR AND EVALUATION ENGINE
2805
THE INTERNET
2803
SELLER
SELLER
SELLER
SELLER
SELLER
2802
2802
2802
2802
2802

FIG.28

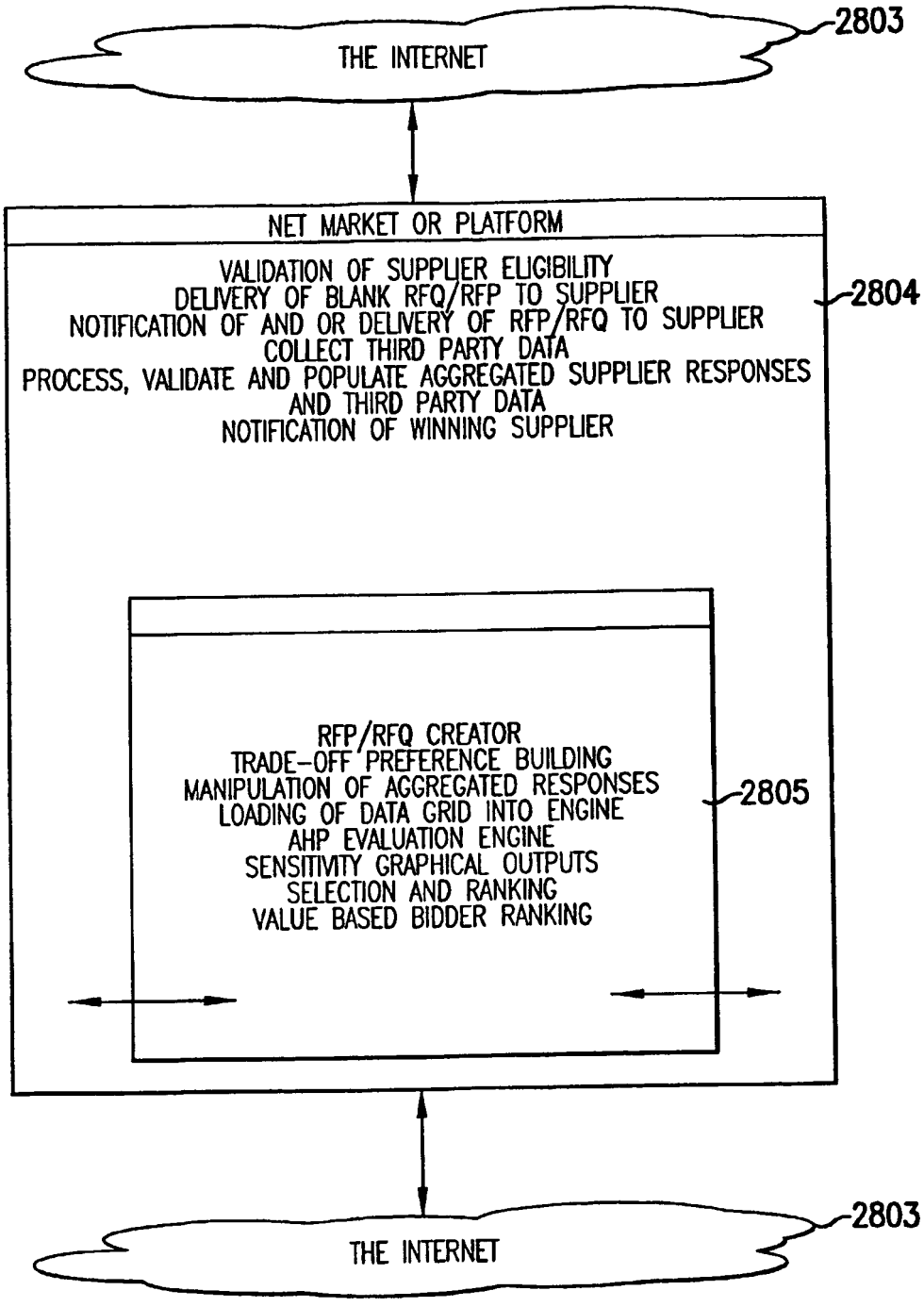

THE INTERNET
2803
NET MARKET OR PLATFORM
VALIDATION OF SUPPLIER ELIGIBILITY
DELIVERY OF BLANK RFQ/RFP TO SUPPLIER
NOTIFICATION OF AND OR DELIVERY OF RFP/RFQ TO SUPPLIER
COLLECT THIRD PARTY DATA
PROCESS, VALIDATE AND POPULATE AGGREGATED SUPPLIER RESPONSES AND THIRD PARTY DATA
NOTIFICATION OF WINNING SUPPLIER
2804
RFP/RFQ CREATOR
TRADE-OFF PREFERENCE BUILDING
MANIPULATION OF AGGREGATED RESPONSES
LOADING OF DATA GRID INTO ENGINE
AHP EVALUATION ENGINE
SENSITIVITY GRAPHICAL OUTPUTS
SELECTION AND RANKING
VALUE BASED BIDDER RANKING
2805
THE INTERNET
2803

FIG.29

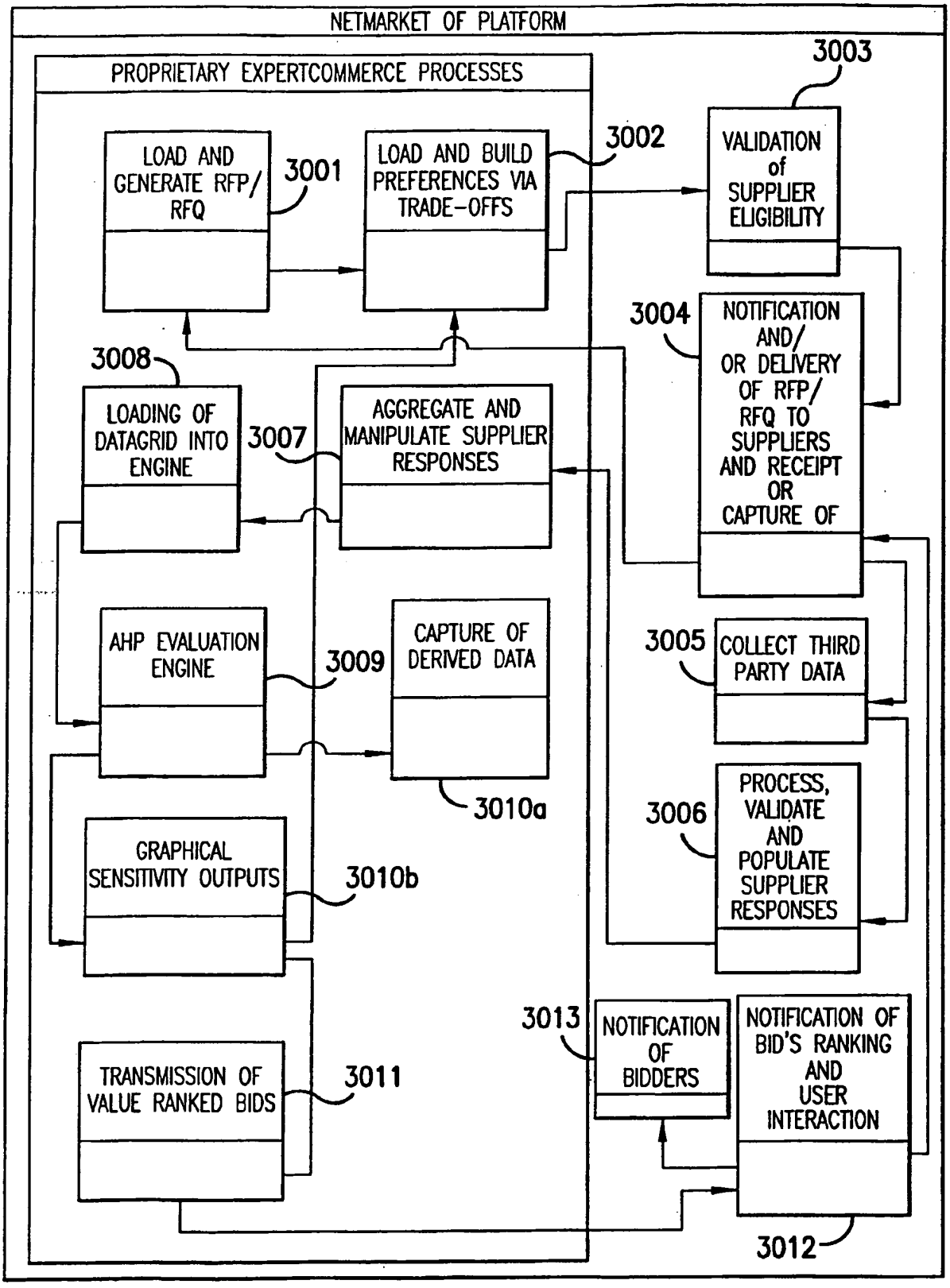

NETMARKET OF PLATFORM
PROPRIETARY EXPERTCOMMERCE PROCESSES
LOAD AND GENERATE RFP/ RFQ
3001
LOAD AND BUILD PREFERENCES VIA TRADE-OFFS
3002
VALIDATION of SUPPLIER ELIGIBILITY
3003
NOTIFICATION AND/ OR DELIVERY OF RFP/ RFQ TO SUPPLIERS AND RECEIPT OR CAPTURE OF
3004
LOADING OF DATAGRID INTO ENGINE
3008
AGGREGATE AND MANIPULATE SUPPLIER RESPONSES
3007
AHP EVALUATION ENGINE
3009
CAPTURE OF DERIVED DATA
3010a
COLLECT THIRD PARTY DATA
3005
PROCESS, VALIDATE AND POPULATE SUPPLIER RESPONSES
3006
GRAPHICAL SENSITIVITY OUTPUTS
3010b
TRANSMISSION OF VALUE RANKED BIDS
3011
NOTIFICATION OF BIDDERS
3013
NOTIFICATION OF BID'S RANKING AND USER INTERACTION
3012

FIG.30

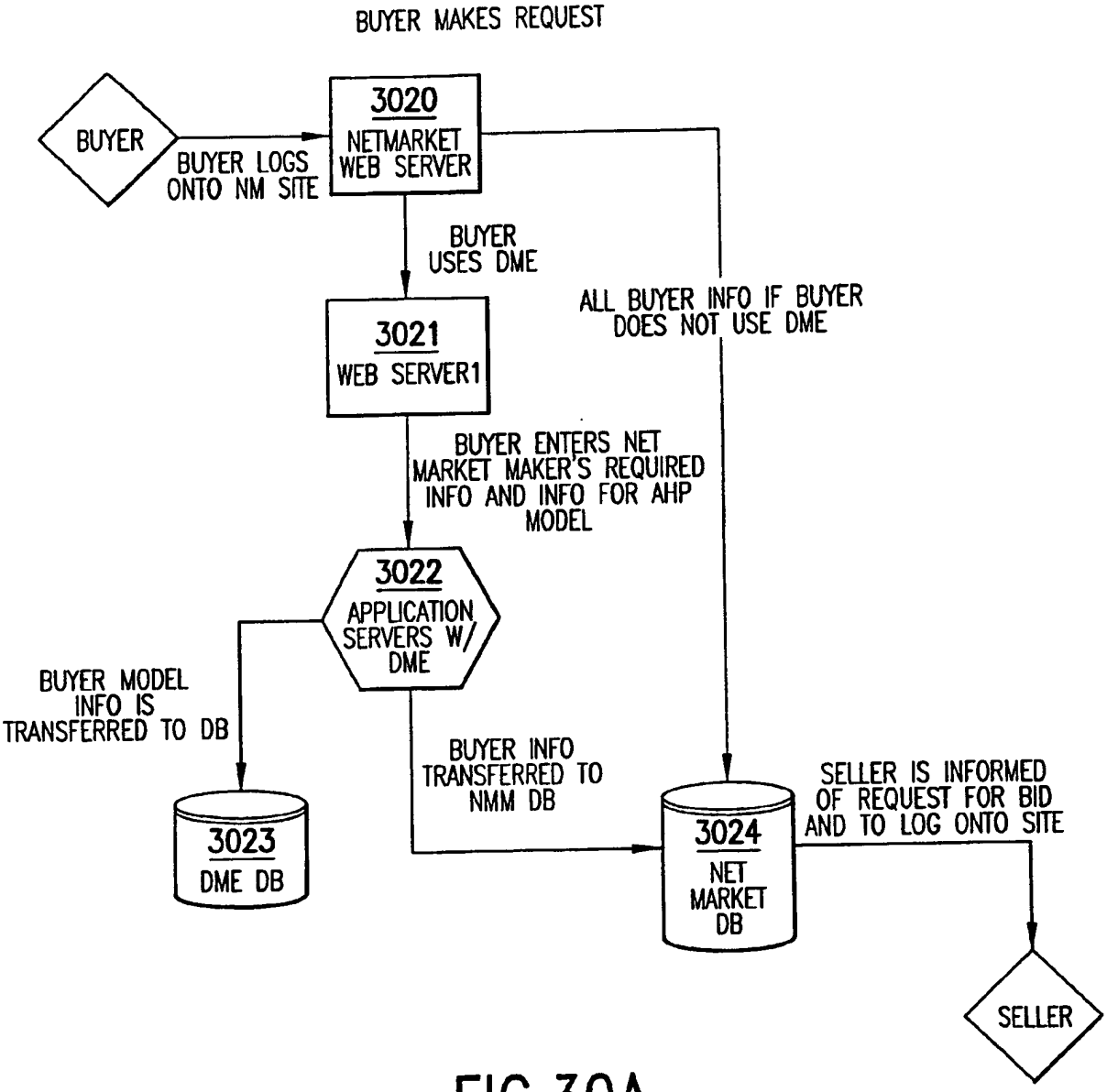

BUYER MAKES REQUEST
BUYER
BUYER LOGS ONTO NM SITE
3020
NETMARKET WEB SERVER
BUYER USES DME
3021
WEB SERVER1
ALL BUYER INFO IF BUYER DOES NOT USE DME
BUYER ENTERS NET MARKET MAKER'S REQUIRED INFO AND INFO FOR AHP MODEL
3022
APPLICATION SERVERS W/ DME
BUYER MODEL INFO IS TRANSFERRED TO DB
BUYER INFO TRANSFERRED TO NMM DB
SELLER IS INFORMED OF REQUEST FOR BID AND TO LOG ONTO SITE
3023
DME DB
3024
NET MARKET DB
SELLER

FIG.30A

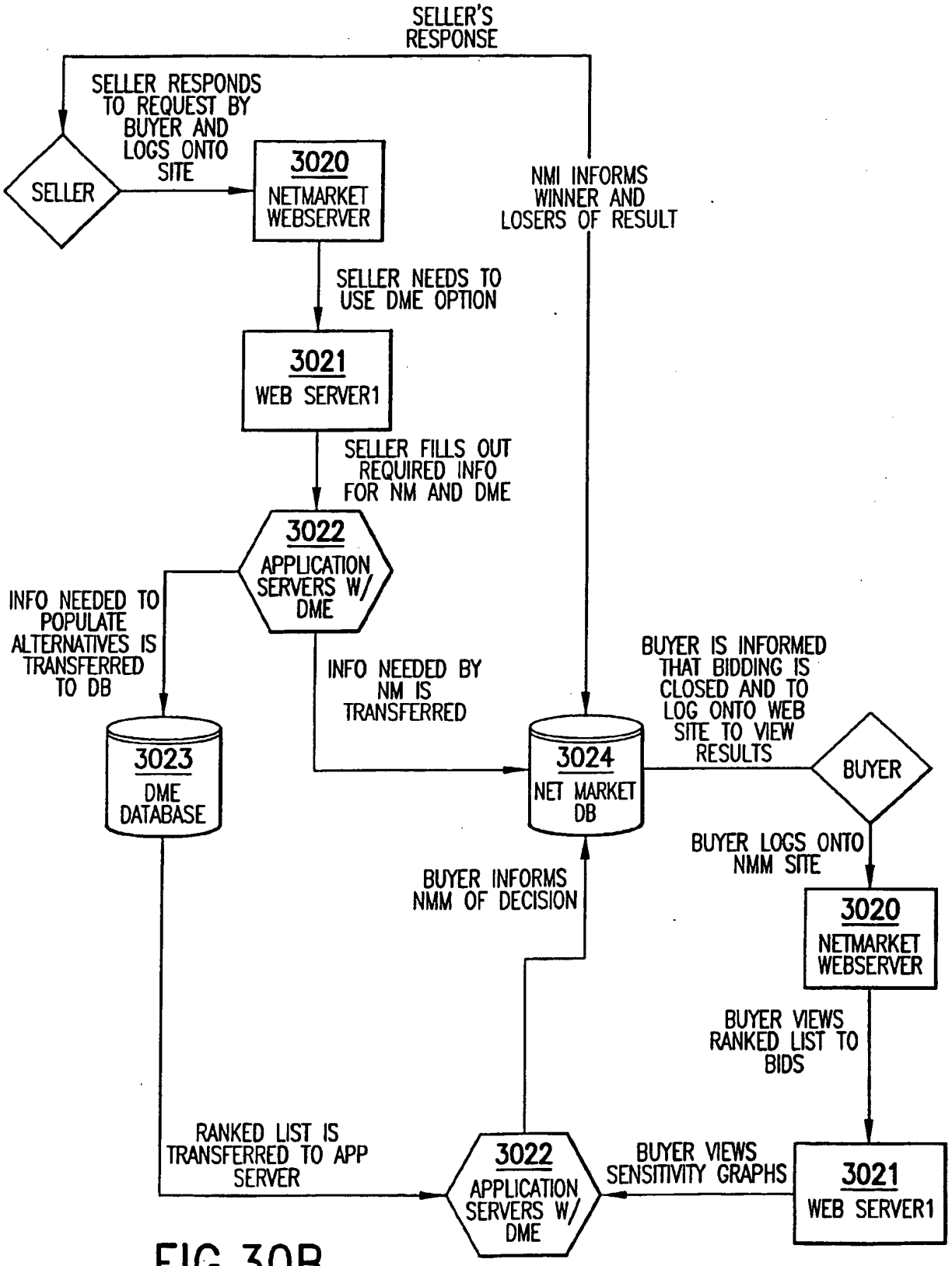

SELLER'S RESPONSE
SELLER RESPONDS TO REQUEST BY BUYER AND LOGS ONTO SITE
SELLER
3020 NETMARKET WEBSERVER
NMI INFORMS WINNER AND LOSERS OF RESULT
SELLER NEEDS TO USE DME OPTION
3021 WEB SERVER1
SELLER FILLS OUT REQUIRED INFO FOR NM AND DME
3022 APPLICATION SERVERS W/ DME
INFO NEEDED TO POPULATE ALTERNATIVES IS TRANSFERRED TO DB
INFO NEEDED BY NM IS TRANSFERRED
BUYER IS INFORMED THAT BIDDING IS CLOSED AND TO LOG ONTO WEB SITE TO VIEW RESULTS
3023 DME DATABASE
3024 NET MARKET DB
BUYER
BUYER LOGS ONTO NMM SITE
BUYER INFORMS NMM OF DECISION
3020 NETMARKET WEBSERVER
BUYER VIEWS RANKED LIST TO BIDS
RANKED LIST IS TRANSFERRED TO APP SERVER
3022 APPLICATION SERVERS W/ DME
BUYER VIEWS SENSITIVITY GRAPHS
3021 WEB SERVER1

FIG.30B

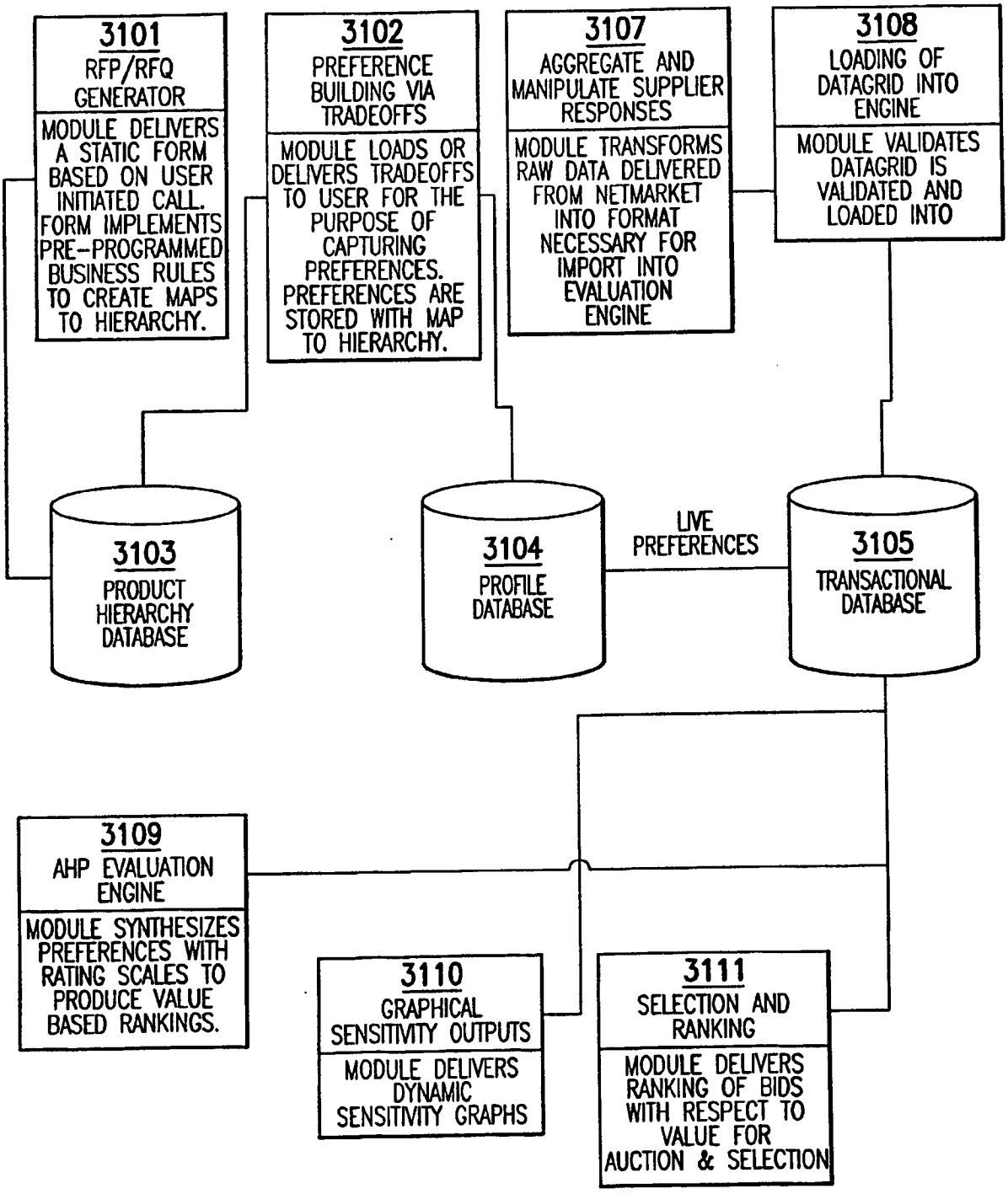

3101
RFP/RFQ GENERATOR
MODULE DELIVERS A STATIC FORM BASED ON USER INITIATED CALL. FORM IMPLEMENTS PRE-PROGRAMMED BUSINESS RULES TO CREATE MAPS TO HIERARCHY.
3102
PREFERENCE BUILDING VIA TRADEOFFS
MODULE LOADS OR DELIVERS TRADEOFFS TO USER FOR THE PURPOSE OF CAPTURING PREFERENCES. PREFERENCES ARE STORED WITH MAP TO HIERARCHY.
3107
AGGREGATE AND MANIPULATE SUPPLIER RESPONSES
MODULE TRANSFORMS RAW DATA DELIVERED FROM NETMARKET INTO FORMAT NECESSARY FOR IMPORT INTO EVALUATION ENGINE
3108
LOADING OF DATAGRID INTO ENGINE
MODULE VALIDATES DATAGRID IS VALIDATED AND LOADED INTO
3103
PRODUCT HIERARCHY DATABASE
3104
PROFILE DATABASE
LIVE PREFERENCES
3105
TRANSACTIONAL DATABASE
3109
AHP EVALUATION ENGINE
MODULE SYNTHESIZES PREFERENCES WITH RATING SCALES TO PRODUCE VALUE BASED RANKINGS.
3110
GRAPHICAL SENSITIVITY OUTPUTS
MODULE DELIVERS DYNAMIC SENSITIVITY GRAPHS
3111
SELECTION AND RANKING
MODULE DELIVERS RANKING OF BIDS WITH RESPECT TO VALUE FOR AUCTION & SELECTION

FIG.31

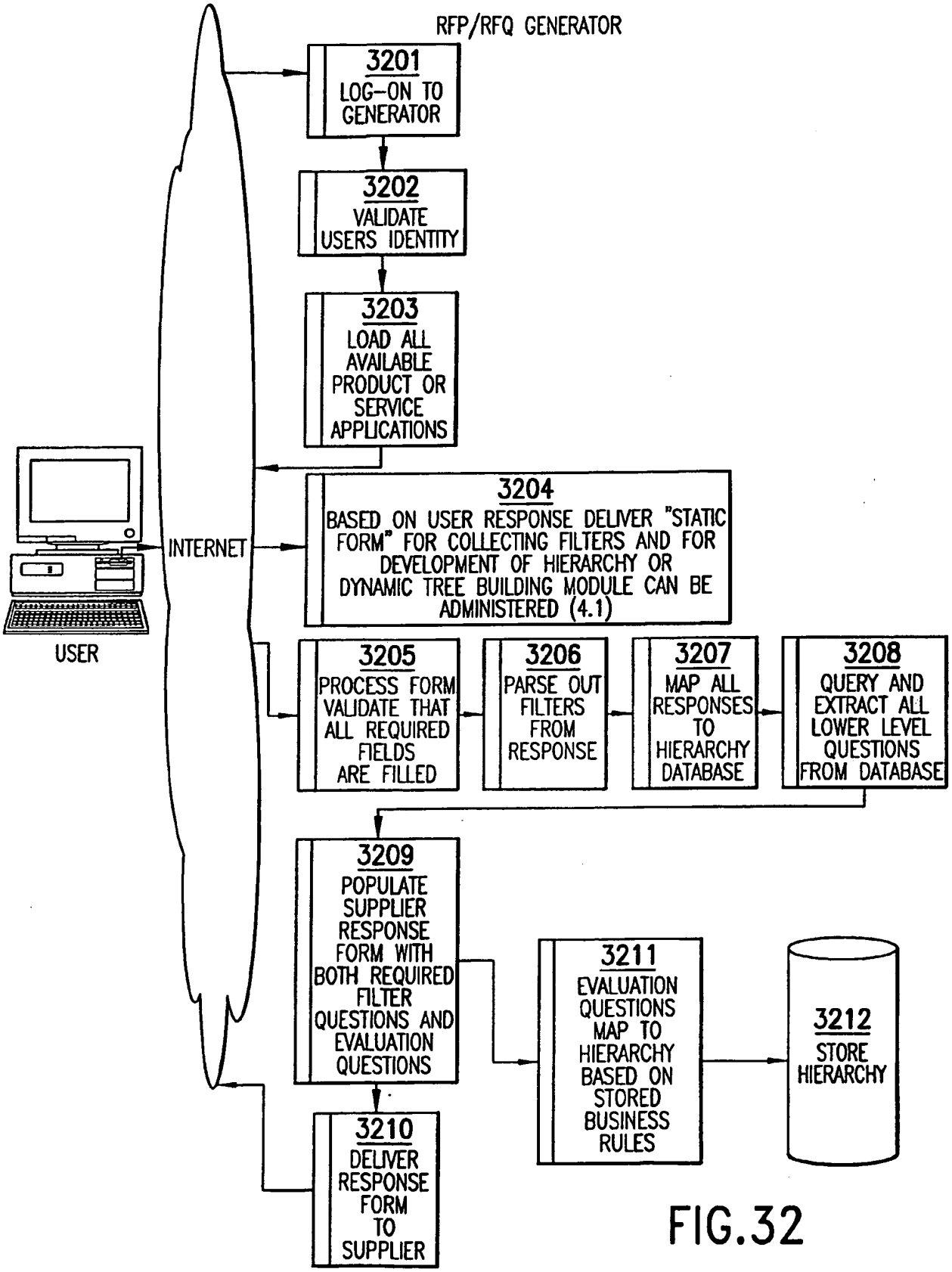

RFP/RFQ GENERATOR
3201
LOG-ON TO GENERATOR
3202
VALIDATE USERS IDENTITY
3203
LOAD ALL AVAILABLE PRODUCT OR SERVICE APPLICATIONS
INTERNET
USER
3204
BASED ON USER RESPONSE DELIVER "STATIC FORM" FOR COLLECTING FILTERS AND FOR DEVELOPMENT OF HIERARCHY OR DYNAMIC TREE BUILDING MODULE CAN BE ADMINISTERED (4.1)
3205
PROCESS FORM VALIDATE THAT ALL REQUIRED FIELDS ARE FILLED
3206
PARSE OUT FILTERS FROM RESPONSE
3207
MAP ALL RESPONSES TO HIERARCHY DATABASE
3208
QUERY AND EXTRACT ALL LOWER LEVEL QUESTIONS FROM DATABASE
3209
POPULATE SUPPLIER RESPONSE FORM WITH BOTH REQUIRED FILTER QUESTIONS AND EVALUATION QUESTIONS
3211
EVALUATION QUESTIONS MAP TO HIERARCHY BASED ON STORED BUSINESS RULES
3212
STORE HIERARCHY
3210
DELIVER RESPONSE FORM TO SUPPLIER

FIG.32

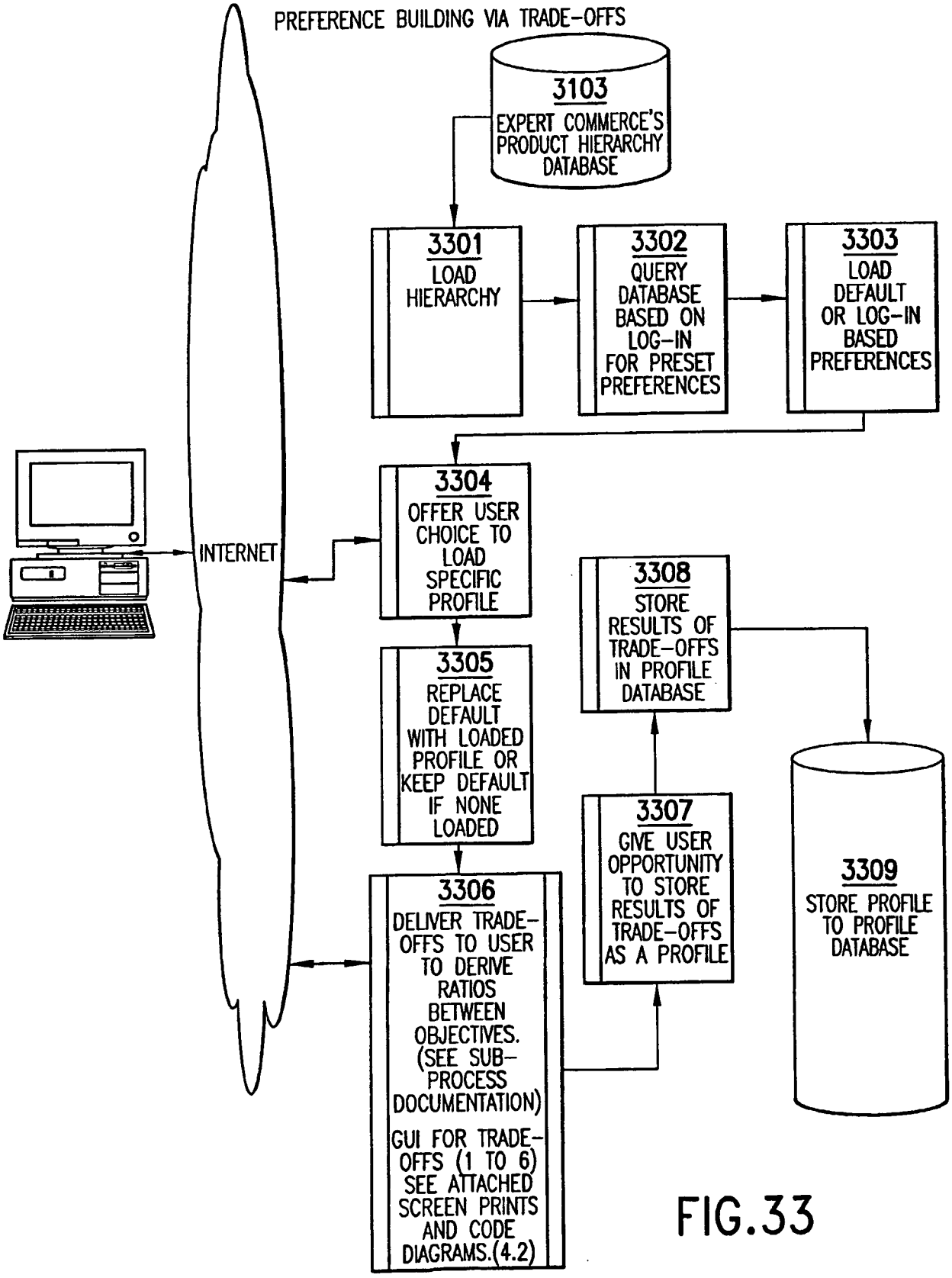

PREFERENCE BUILDING VIA TRADE-OFFS
3103
EXPERT COMMERCE'S PRODUCT HIERARCHY DATABASE
3301
LOAD HIERARCHY
3302
QUERY DATABASE BASED ON LOG-IN FOR PRESET PREFERENCES
3303
LOAD DEFAULT OR LOG-IN BASED PREFERENCES
INTERNET
3304
OFFER USER CHOICE TO LOAD SPECIFIC PROFILE
3305
REPLACE DEFAULT WITH LOADED PROFILE OR KEEP DEFAULT IF NONE LOADED
3306
DELIVER TRADE-OFFS TO USER TO DERIVE RATIOS BETWEEN OBJECTIVES. (SEE SUB-PROCESS DOCUMENTATION)
GUI FOR TRADE-OFFS (1 TO 6) SEE ATTACHED SCREEN PRINTS AND CODE DIAGRAMS.(4.2)
3307
GIVE USER OPPORTUNITY TO STORE RESULTS OF TRADE-OFFS AS A PROFILE
3308
STORE RESULTS OF TRADE-OFFS IN PROFILE DATABASE
3309
STORE PROFILE TO PROFILE DATABASE

FIG.33

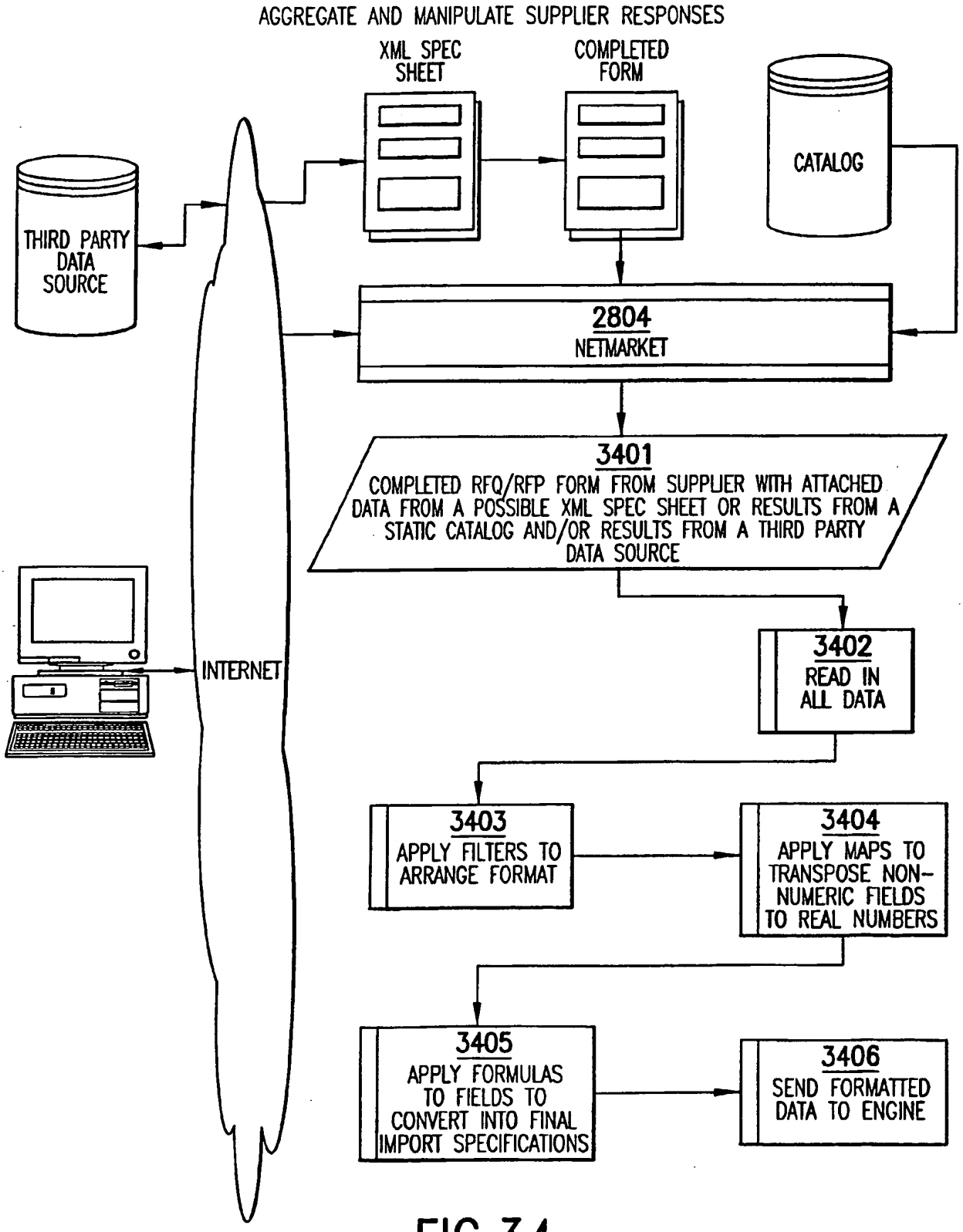

AGGREGATE AND MANIPULATE SUPPLIER RESPONSES
XML SPEC SHEET
COMPLETED FORM
CATALOG
THIRD PARTY DATA SOURCE
2804
NETMARKET
3401
COMPLETED RFQ/RFP FORM FROM SUPPLIER WITH ATTACHED DATA FROM A POSSIBLE XML SPEC SHEET OR RESULTS FROM A STATIC CATALOG AND/OR RESULTS FROM A THIRD PARTY DATA SOURCE
INTERNET
3402
READ IN ALL DATA
3403
APPLY FILTERS TO ARRANGE FORMAT
3404
APPLY MAPS TO TRANSPOSE NON-NUMERIC FIELDS TO REAL NUMBERS
3405
APPLY FORMULAS TO FIELDS TO CONVERT INTO FINAL IMPORT SPECIFICATIONS
3406
SEND FORMATTED DATA TO ENGINE

FIG.34

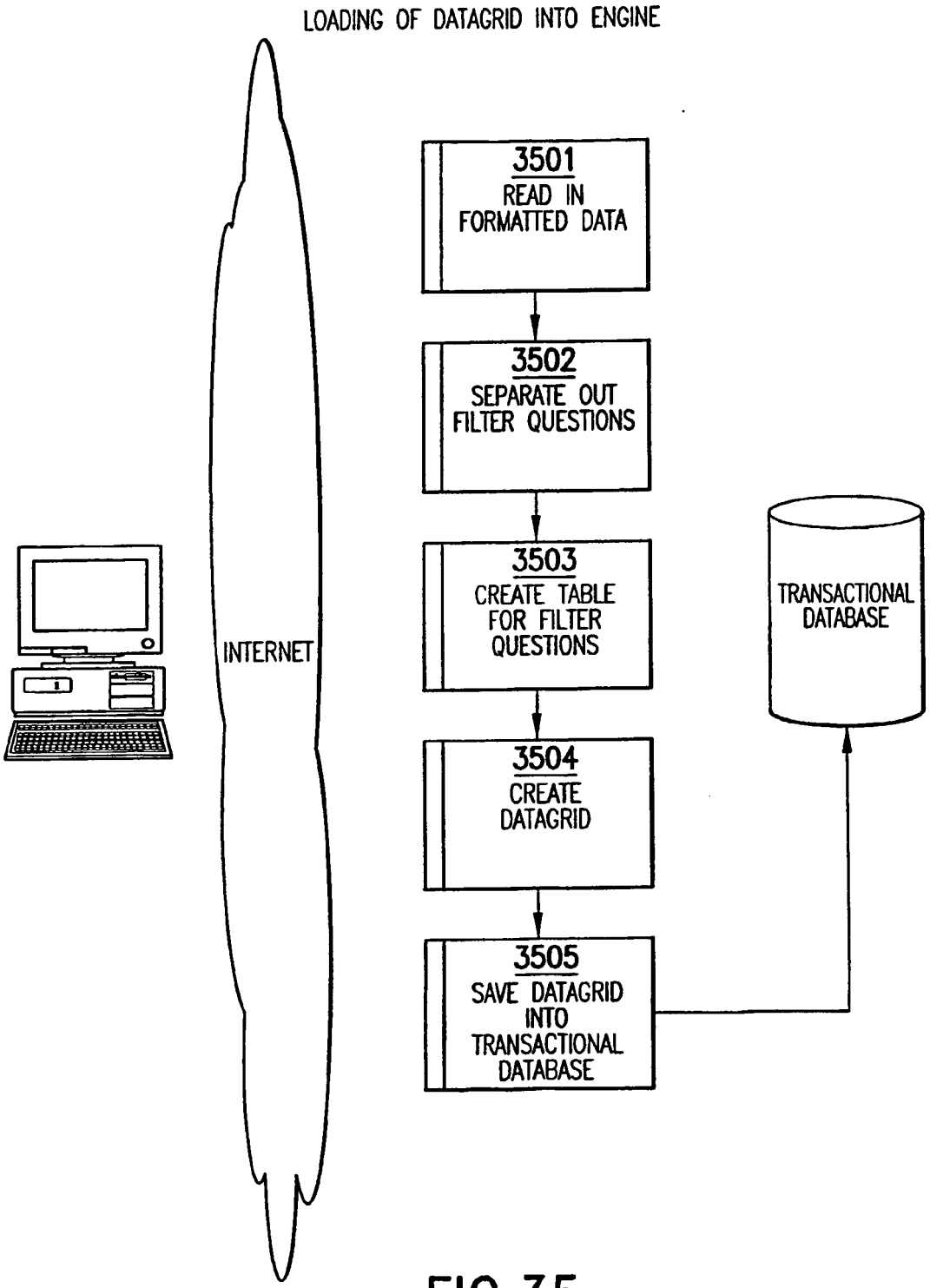

LOADING OF DATAGRID INTO ENGINE
INTERNET
3501
READ IN FORMATTED DATA
3502
SEPARATE OUT FILTER QUESTIONS
3503
CREATE TABLE FOR FILTER QUESTIONS
3504
CREATE DATAGRID
3505
SAVE DATAGRID INTO TRANSACTIONAL DATABASE
TRANSACTIONAL DATABASE

FIG.35

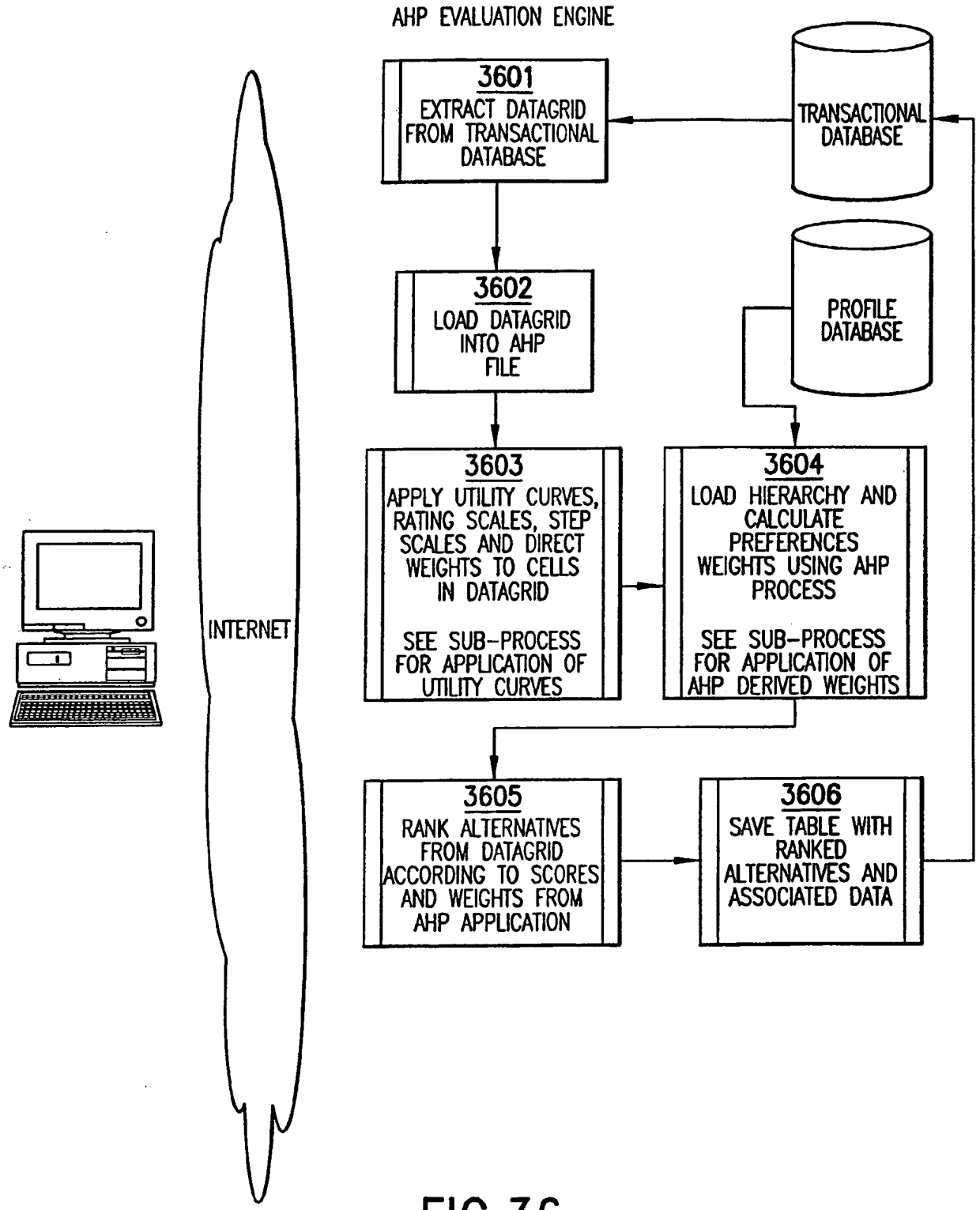

AHP EVALUATION ENGINE
3601
EXTRACT DATAGRID FROM TRANSACTIONAL DATABASE
TRANSACTIONAL DATABASE
3602
LOAD DATAGRID INTO AHP FILE
PROFILE DATABASE
3603
APPLY UTILITY CURVES, RATING SCALES, STEP SCALES AND DIRECT WEIGHTS TO CELLS IN DATAGRID
SEE SUB-PROCESS FOR APPLICATION OF UTILITY CURVES
3604
LOAD HIERARCHY AND CALCULATE PREFERENCES WEIGHTS USING AHP PROCESS
SEE SUB-PROCESS FOR APPLICATION OF AHP DERIVED WEIGHTS
INTERNET
3605
RANK ALTERNATIVES FROM DATAGRID ACCORDING TO SCORES AND WEIGHTS FROM AHP APPLICATION
3606
SAVE TABLE WITH RANKED ALTERNATIVES AND ASSOCIATED DATA

FIG.36

		COVERING OBJECTIVE 1	COVERING OBJECTIVE 2	COVERING OBJECTIVE 3	COVERING OBJECTIVE 4	COVERING OBJECTIVE 5	COVERING OBJECTIVE 6	COVERING OBJECTIVE 7	COVERING OBJECTIVE n
		RATING SCALE FORMULA	STEP SCALE FORMULA	INCREASING MARGINAL UTILITY CURVE	DECREASING UTILITY CURVE	y=mx+b			
ALTERNATIVE 1		RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE
ALTERNATIVE 2		RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE
ALTERNATIVE 3		RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE
ALTERNATIVE 4		RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE
ALTERNATIVE 5		RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE
ALTERNATIVE 6		RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE
ALTERNATIVE n		RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE	RAW DATA SCORE

FIG.36A

SUBSTITUTE SHEET (RULE 26)

	COVERING OBJECTIVE 1	COVERING OBJECTIVE 2	COVERING OBJECTIVE 3	COVERING OBJECTIVE 4	COVERING OBJECTIVE 5	COVERING OBJECTIVE 6	COVERING OBJECTIVE 7	COVERING OBJECTIVE n
	RATING SCALE FORMULA	STEP SCALE FORMULA	INCREASING MARGINAL UTILITY CURVE	DECREASING UTILITY CURVE	y=mx+b			
ALTERNATIVE 1	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE
ALTERNATIVE 2	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE
ALTERNATIVE 6	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE
ALTERNATIVE n	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE	ALT VALUE= RAW SCORE INTERCEPT WITH UTILITY CURVE

FIG.36B

GLOBAL PRIORITIES SUM TO 1.0	TOTAL SCORE	COVERING OBJECTIVE 1	COVERING OBJECTIVE 2	COVERING OBJECTIVE 3	COVERING OBJECTIVE 4	COVERING OBJECTIVE 5	COVERING OBJECTIVE 6	COVERING OBJECTIVE 7	COVERING OBJECTIVE n
		GLOBAL PRIORITY .12	GLOBAL PRIORITY .05	GLOBAL PRIORITY .13	GLOBAL PRIORITY .09	GLOBAL PRIORITY .21	GLOBAL PRIORITY .14	GLOBAL PRIORITY .12	GLOBAL PRIORITY .14
ALTERNATIVE 1	TOTAL SCORE= SUM(GPi*ALT VALUEi)i=1-n	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE
ALTERNATIVE 2	TOTAL SCORE= SUM(GPi*ALT VALUEi)i=1-n	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE
ALTERNATIVE 6	TOTAL SCORE= SUM(GPi*ALT VALUEi)i=1-n	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE
ALTERNATIVE n	TOTAL SCORE= SUM(GPi*ALT VALUEi)i=1-n	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE	ALT VALUE SCORE

FIG.36C

GLOBAL PRIORITIES SUM TO 1.0	TOTAL SCORE	COVERING OBJECTIVE 1	COVERING OBJECTIVE 2	COVERING OBJECTIVE 3	COVERING OBJECTIVE 4	COVERING OBJECTIVE 5	COVERING OBJECTIVE 6	COVERING OBJECTIVE 7	COVERING OBJECTIVE n
		0.12	0.05	0.13	0.09	0.21	0.14	0.12	0.14
ALTERNATIVE 1	0.48189	0.5	0.9	0.2	0.565	0.34	0.876	0.23	0.56
ALTERNATIVE 2	0.6047	0.65	0.34	0.67	0.34	0.78	0.56	0.98	0.23
ALTERNATIVE 6	SUM((.34*.12), (.56*.05), (.546*.13), (.56*.09), (.45*.21), (.56*.14), (.34*.12), (.45*.14))	0.34	0.56	0.546	0.56	0.45	0.56	0.34	0.45
ALTERNATIVE n	0.5614	0.32	0.67	0.78	0.89	0.56	0.23	0.56	0.65

FIG.36D

SUBSTITUTE SHEET (RULE 26)

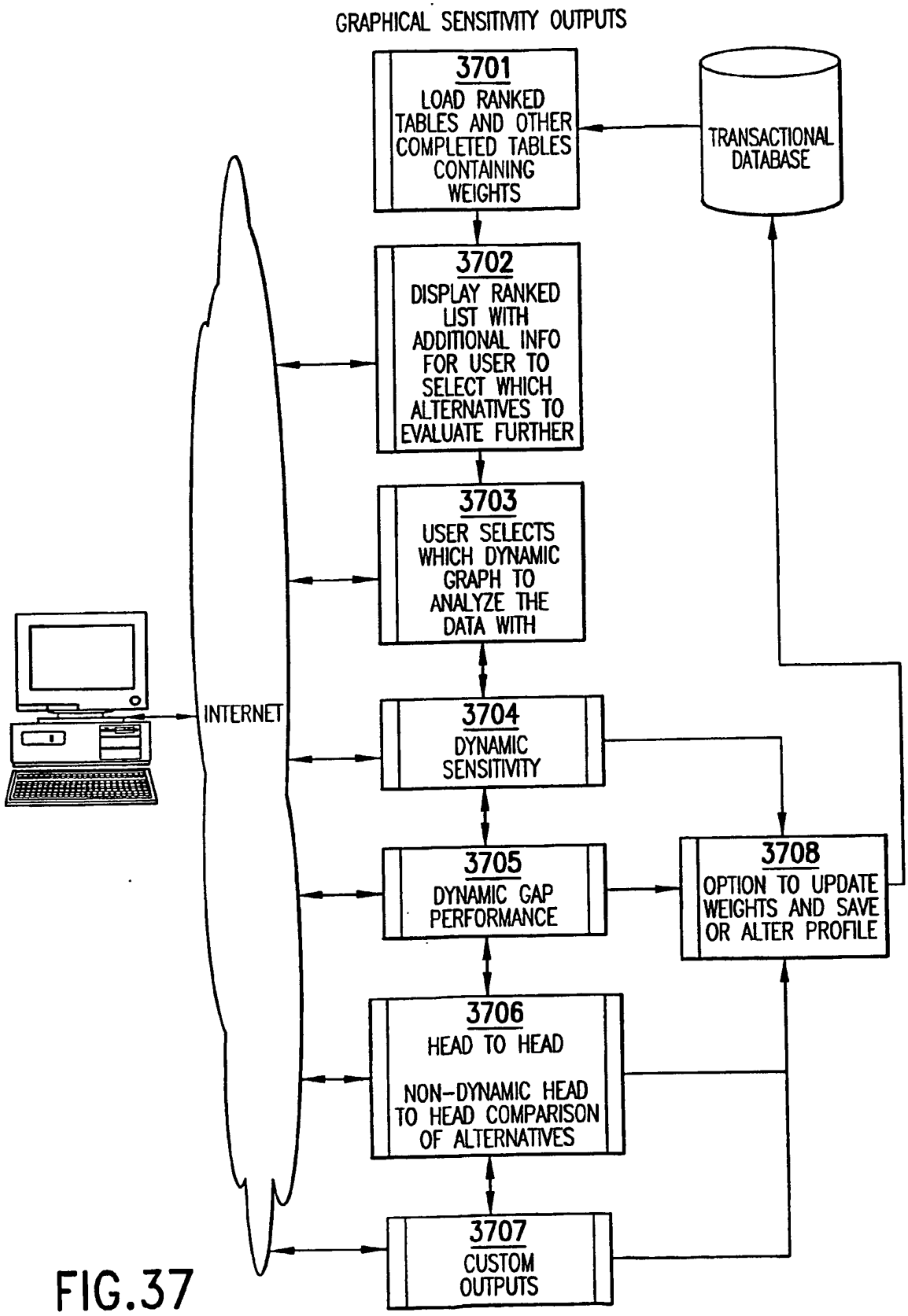

GRAPHICAL SENSITIVITY OUTPUTS
3701
LOAD RANKED TABLES AND OTHER COMPLETED TABLES CONTAINING WEIGHTS
TRANSACTIONAL DATABASE
3702
DISPLAY RANKED LIST WITH ADDITIONAL INFO FOR USER TO SELECT WHICH ALTERNATIVES TO EVALUATE FURTHER
3703
USER SELECTS WHICH DYNAMIC GRAPH TO ANALYZE THE DATA WITH
INTERNET
3704
DYNAMIC SENSITIVITY
3705
DYNAMIC GAP PERFORMANCE
3708
OPTION TO UPDATE WEIGHTS AND SAVE OR ALTER PROFILE
3706
HEAD TO HEAD
NON-DYNAMIC HEAD TO HEAD COMPARISON OF ALTERNATIVES
3707
CUSTOM OUTPUTS

FIG.37

DYNAMIC DECISION TREE BUILDER MODULE

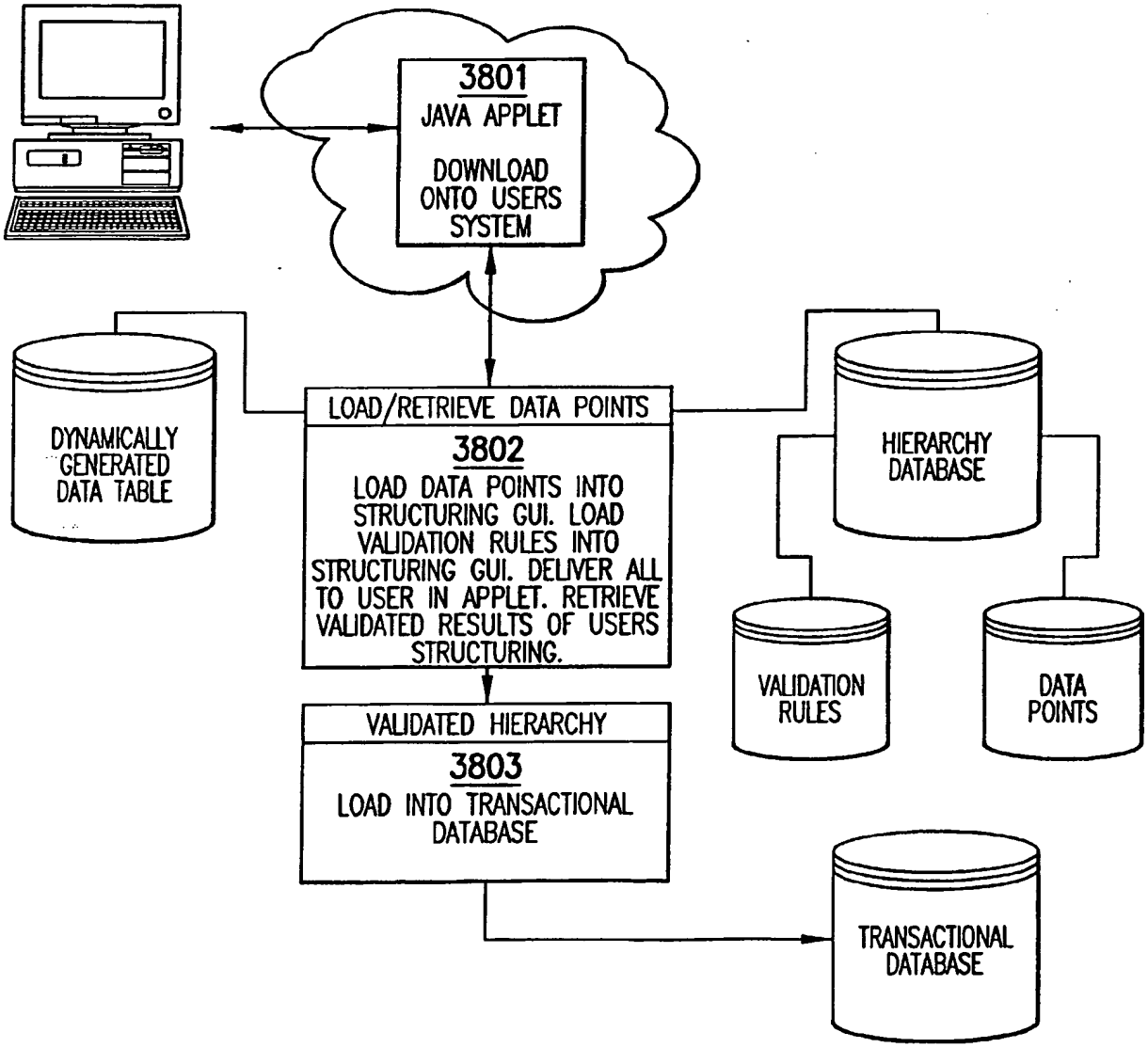
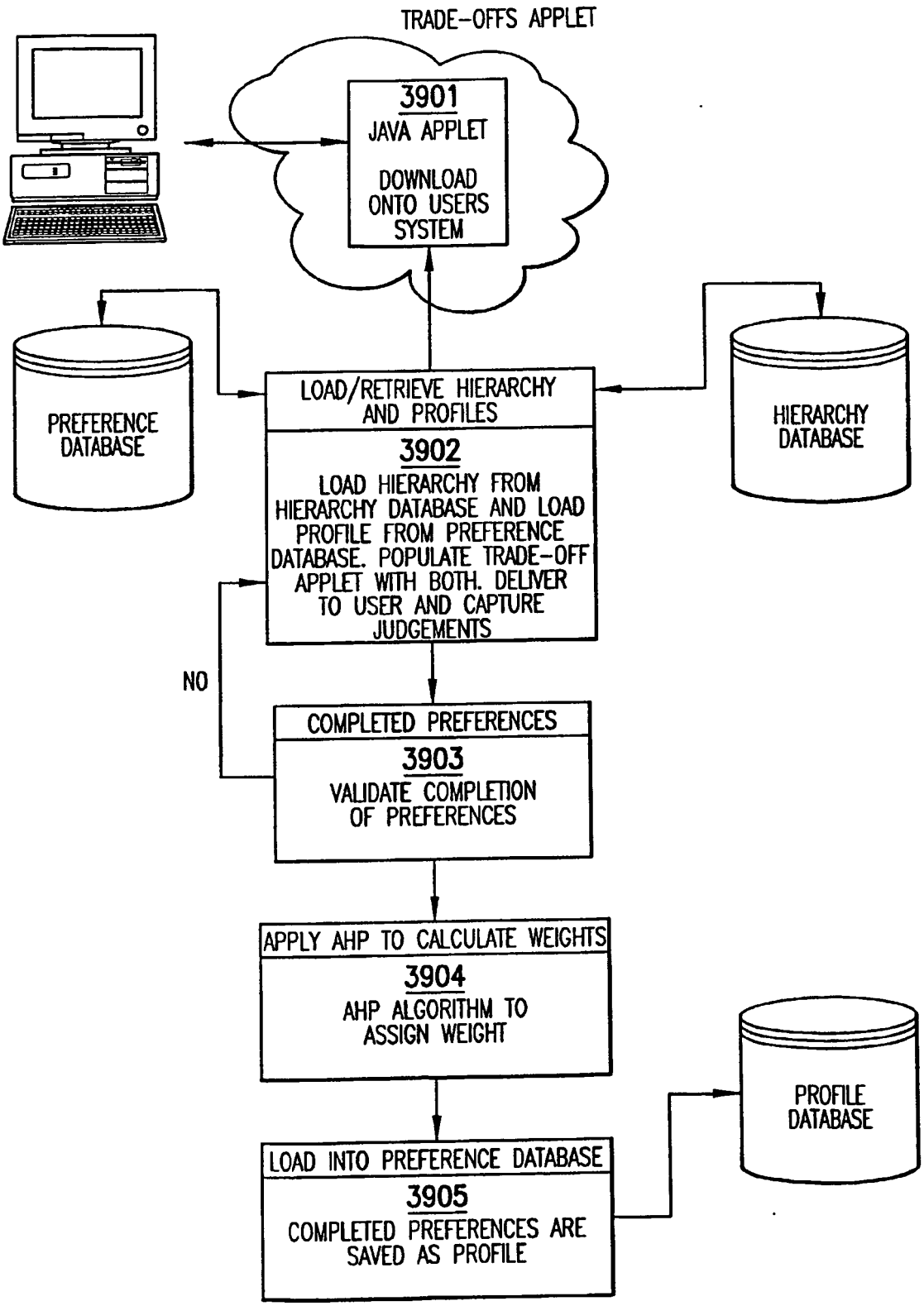


FIG.38


TRADE-OFFS APPLET
3901
JAVA APPLET
DOWNLOAD ONTO USERS SYSTEM
PREFERENCE DATABASE
HIERARCHY DATABASE
LOAD/RETRIEVE HIERARCHY AND PROFILES
3902
LOAD HIERARCHY FROM HIERARCHY DATABASE AND LOAD PROFILE FROM PREFERENCE DATABASE. POPULATE TRADE-OFF APPLET WITH BOTH. DELIVER TO USER AND CAPTURE JUDGEMENTS
NO
COMPLETED PREFERENCES
3903
VALIDATE COMPLETION OF PREFERENCES
APPLY AHP TO CALCULATE WEIGHTS
3904
AHP ALGORITHM TO ASSIGN WEIGHT
PROFILE DATABASE
LOAD INTO PREFERENCE DATABASE
3905
COMPLETED PREFERENCES ARE SAVED AS PROFILE

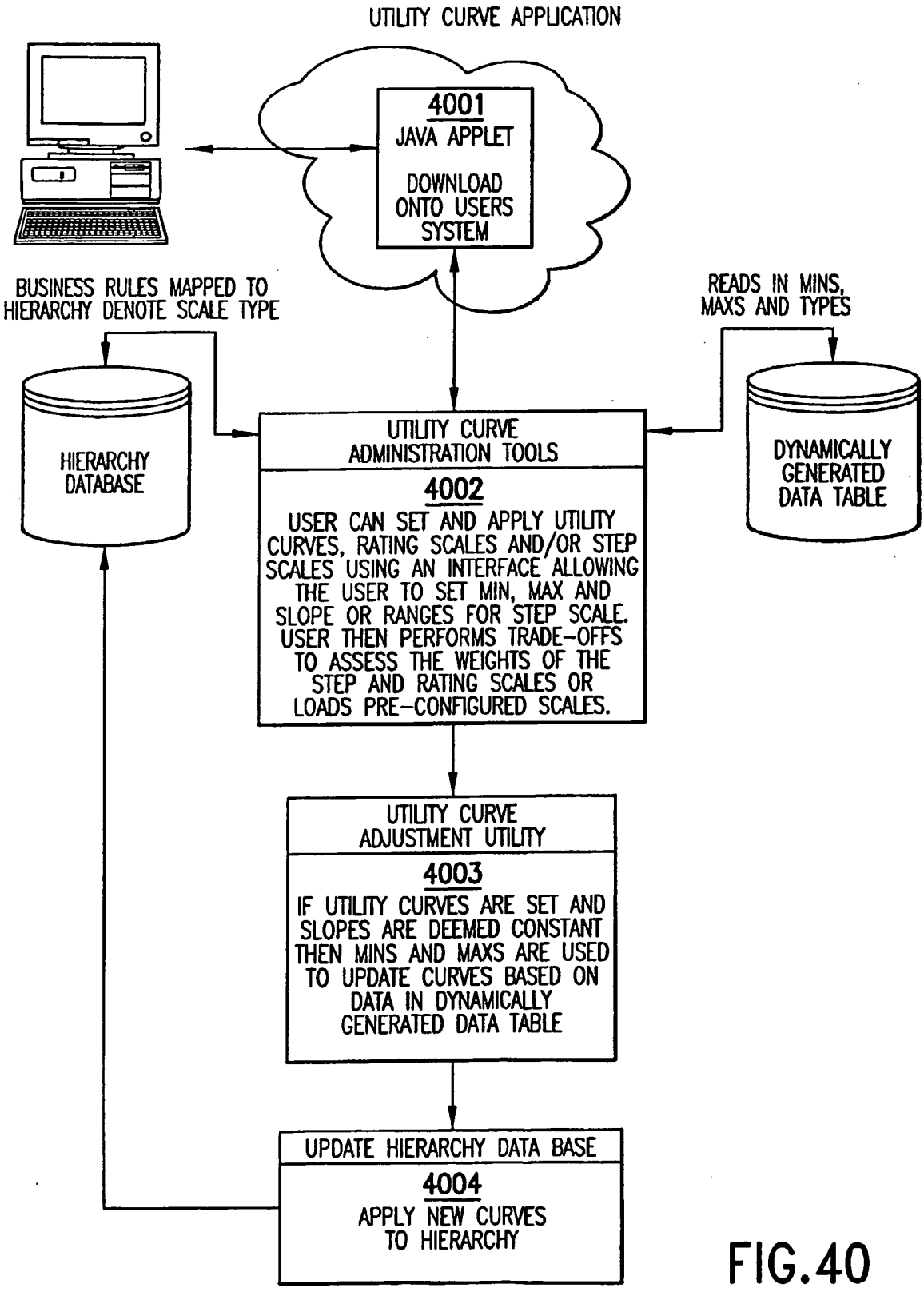

UTILITY CURVE APPLICATION
4001
JAVA APPLET
DOWNLOAD ONTO USERS SYSTEM
BUSINESS RULES MAPPED TO HIERARCHY DENOTE SCALE TYPE
READS IN MINS, MAXS AND TYPES
HIERARCHY DATABASE
DYNAMICALLY GENERATED DATA TABLE
UTILITY CURVE ADMINISTRATION TOOLS
4002
USER CAN SET AND APPLY UTILITY CURVES, RATING SCALES AND/OR STEP SCALES USING AN INTERFACE ALLOWING THE USER TO SET MIN, MAX AND SLOPE OR RANGES FOR STEP SCALE. USER THEN PERFORMS TRADE-OFFS TO ASSESS THE WEIGHTS OF THE STEP AND RATING SCALES OR LOADS PRE-CONFIGURED SCALES.
UTILITY CURVE ADJUSTMENT UTILITY
4003
IF UTILITY CURVES ARE SET AND SLOPES ARE DEEMED CONSTANT THEN MINS AND MAXS ARE USED TO UPDATE CURVES BASED ON DATA IN DYNAMICALLY GENERATED DATA TABLE
UPDATE HIERARCHY DATA BASE
4004
APPLY NEW CURVES TO HIERARCHY

FIG.40

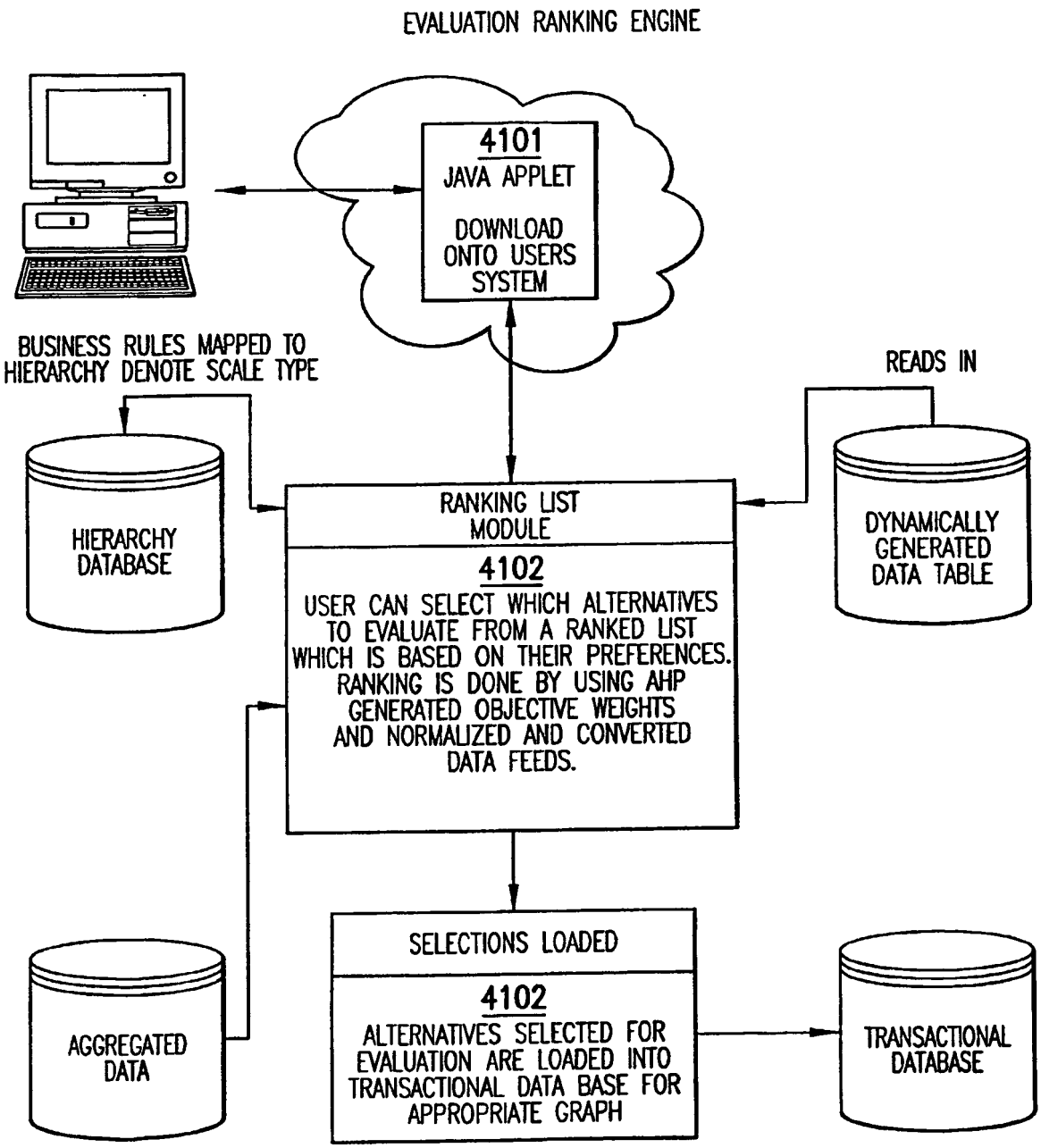

EVALUATION RANKING ENGINE
4101
JAVA APPLET
DOWNLOAD ONTO USERS SYSTEM
BUSINESS RULES MAPPED TO HIERARCHY DENOTE SCALE TYPE
READS IN
HIERARCHY DATABASE
RANKING LIST MODULE
4102
USER CAN SELECT WHICH ALTERNATIVES TO EVALUATE FROM A RANKED LIST WHICH IS BASED ON THEIR PREFERENCES. RANKING IS DONE BY USING AHP GENERATED OBJECTIVE WEIGHTS AND NORMALIZED AND CONVERTED DATA FEEDS.
DYNAMICALLY GENERATED DATA TABLE
AGGREGATED DATA
SELECTIONS LOADED
4102
ALTERNATIVES SELECTED FOR EVALUATION ARE LOADED INTO TRANSACTIONAL DATA BASE FOR APPROPRIATE GRAPH
TRANSACTIONAL DATABASE

FIG.41

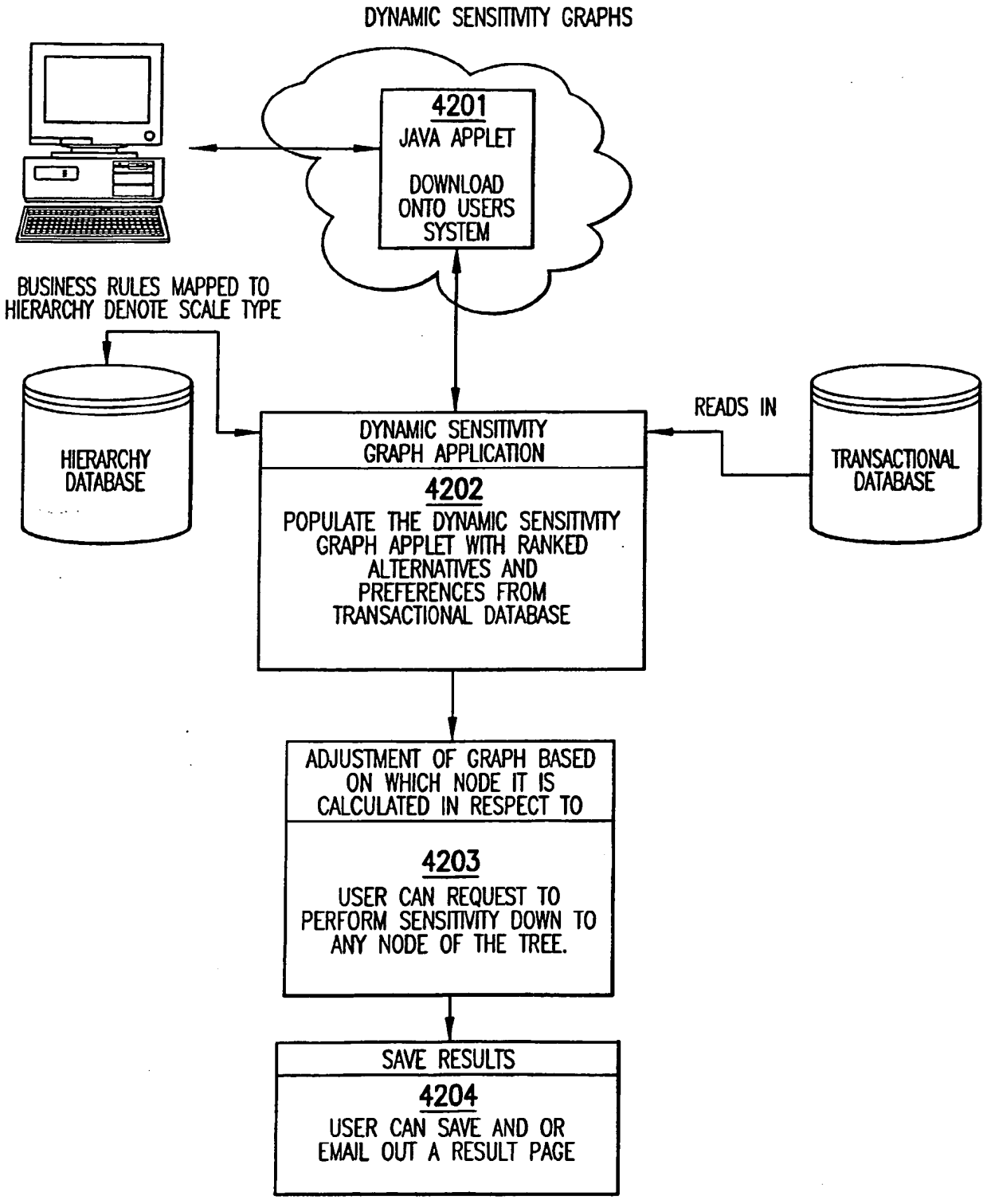

DYNAMIC SENSITIVITY GRAPHS
4201
JAVA APPLET
DOWNLOAD ONTO USERS SYSTEM
BUSINESS RULES MAPPED TO HIERARCHY DENOTE SCALE TYPE
HIERARCHY DATABASE
DYNAMIC SENSITIVITY GRAPH APPLICATION
4202
POPULATE THE DYNAMIC SENSITIVITY GRAPH APPLET WITH RANKED ALTERNATIVES AND PREFERENCES FROM TRANSACTIONAL DATABASE
READS IN
TRANSACTIONAL DATABASE
ADJUSTMENT OF GRAPH BASED ON WHICH NODE IT IS CALCULATED IN RESPECT TO
4203
USER CAN REQUEST TO PERFORM SENSITIVITY DOWN TO ANY NODE OF THE TREE.
SAVE RESULTS
4204
USER CAN SAVE AND OR EMAIL OUT A RESULT PAGE

FIG.42

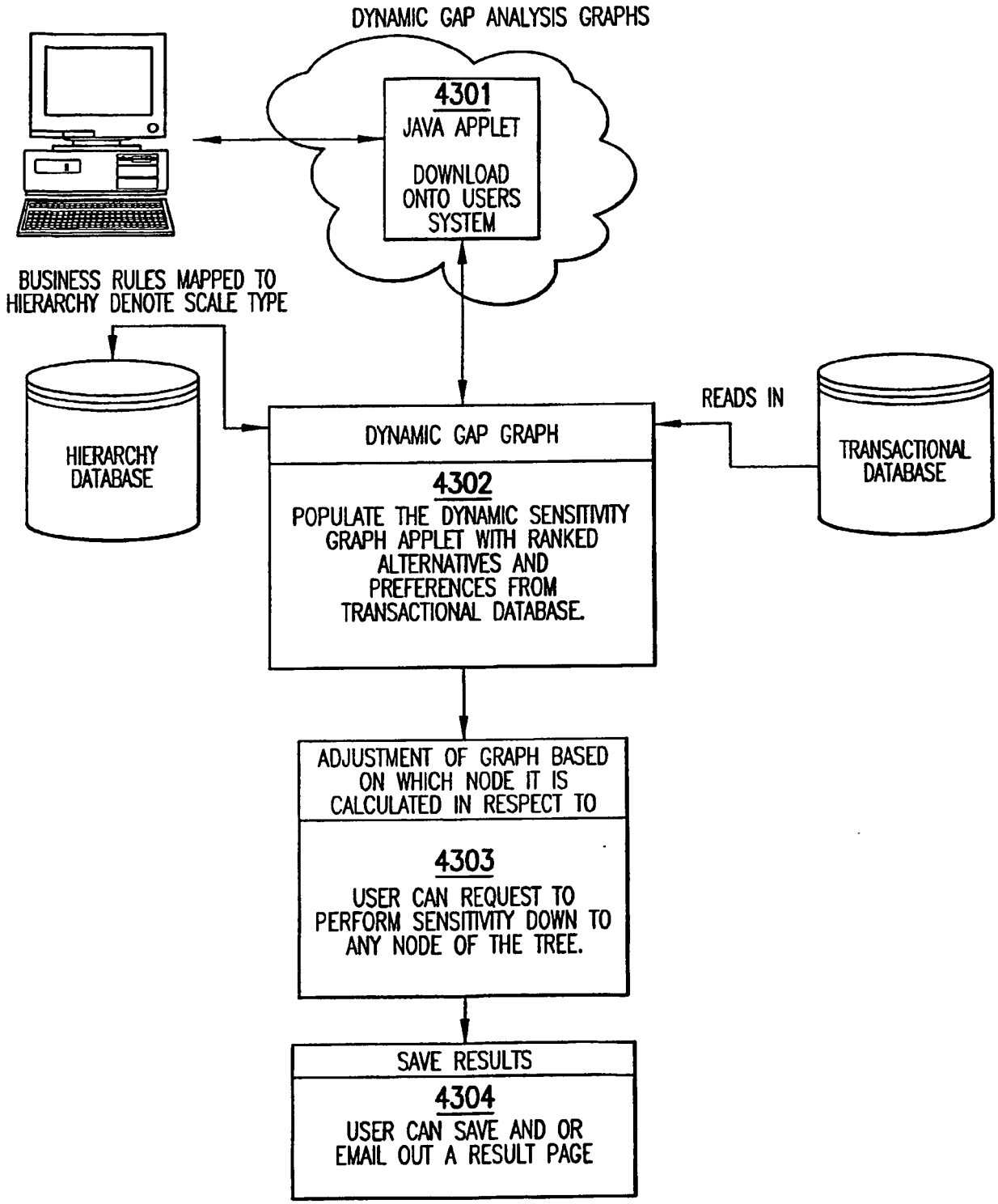

DYNAMIC GAP ANALYSIS GRAPHS
4301
JAVA APPLET
DOWNLOAD ONTO USERS SYSTEM
BUSINESS RULES MAPPED TO HIERARCHY DENOTE SCALE TYPE
HIERARCHY DATABASE
DYNAMIC GAP GRAPH
4302
POPULATE THE DYNAMIC SENSITIVITY GRAPH APPLET WITH RANKED ALTERNATIVES AND PREFERENCES FROM TRANSACTIONAL DATABASE.
READS IN
TRANSACTIONAL DATABASE
ADJUSTMENT OF GRAPH BASED ON WHICH NODE IT IS CALCULATED IN RESPECT TO
4303
USER CAN REQUEST TO PERFORM SENSITIVITY DOWN TO ANY NODE OF THE TREE.
SAVE RESULTS
4304
USER CAN SAVE AND OR EMAIL OUT A RESULT PAGE

FIG.43

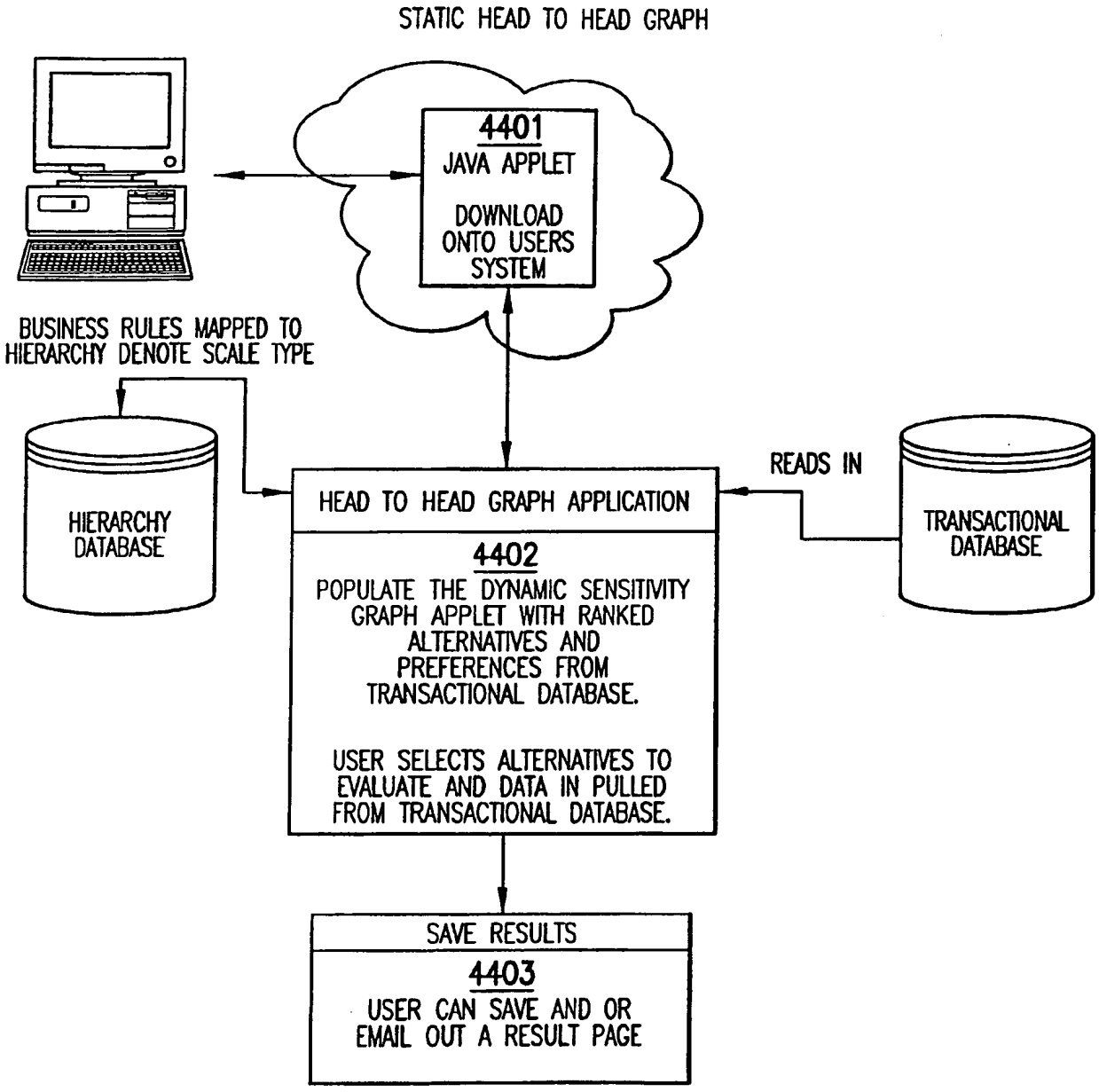

STATIC HEAD TO HEAD GRAPH
4401
JAVA APPLET
DOWNLOAD ONTO USERS SYSTEM
BUSINESS RULES MAPPED TO HIERARCHY DENOTE SCALE TYPE
HIERARCHY DATABASE
HEAD TO HEAD GRAPH APPLICATION
4402
POPULATE THE DYNAMIC SENSITIVITY GRAPH APPLET WITH RANKED ALTERNATIVES AND PREFERENCES FROM TRANSACTIONAL DATABASE.
USER SELECTS ALTERNATIVES TO EVALUATE AND DATA IN PULLED FROM TRANSACTIONAL DATABASE.
READS IN
TRANSACTIONAL DATABASE
SAVE RESULTS
4403
USER CAN SAVE AND OR EMAIL OUT A RESULT PAGE

FIG.44

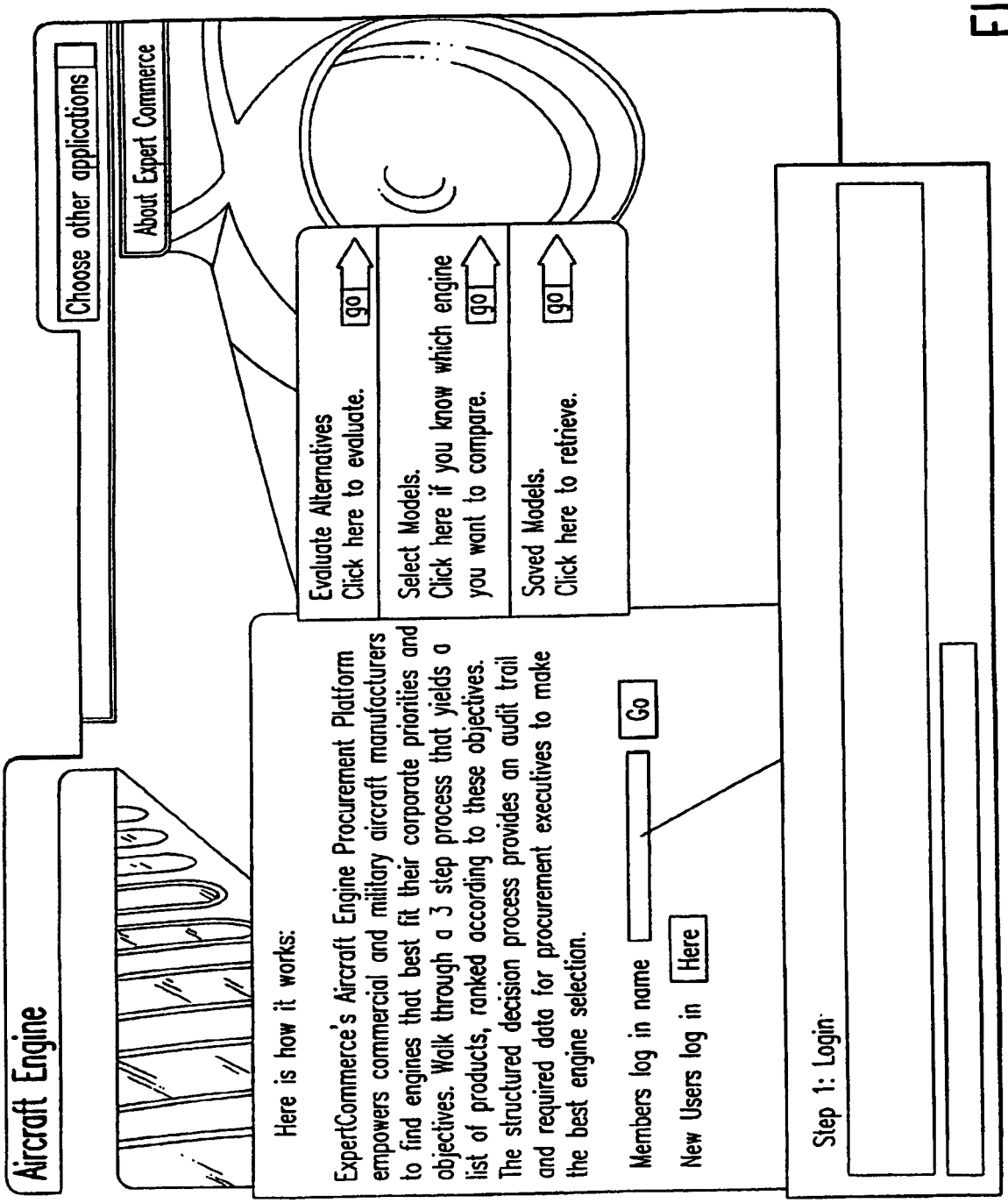

Aircraft Engine
Choose other applications
About Expert Commerce
Here is how it works:
ExpertCommerce's Aircraft Engine Procurement Platform empowers commercial and military aircraft manufacturers to find engines that best fit their corporate priorities and objectives. Walk through a 3 step process that yields a list of products, ranked according to these objectives. The structured decision process provides an audit trail and required data for procurement executives to make the best engine selection.
Members log in name
Go
New Users log in
Here
Evaluate Alternatives
Click here to evaluate.
go
Select Models.
Click here if you know which engine you want to compare.
go
Saved Models.
Click here to retrieve.
go
Step 1: Login

FIG.45

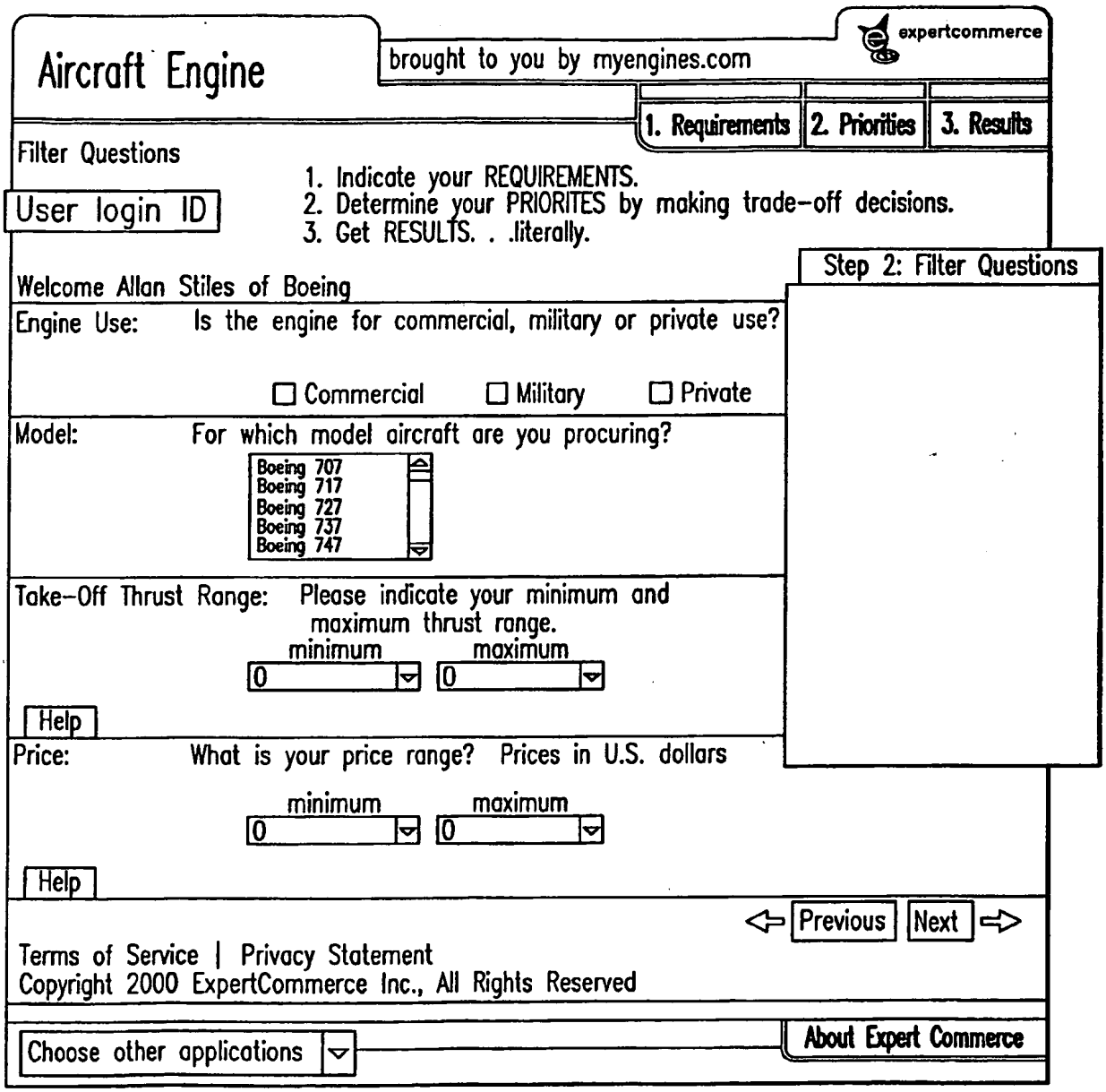

Aircraft Engine
brought to you by myengines.com
expertcommerce
1. Requirements
2. Priorities
3. Results
Filter Questions
User login ID
1. Indicate your REQUIREMENTS.
2. Determine your PRIORITES by making trade-off decisions.
3. Get RESULTS. . .literally.
Step 2: Filter Questions
Welcome Allan Stiles of Boeing
Engine Use: Is the engine for commercial, military or private use?
Commercial
Military
Private
Model: For which model aircraft are you procuring?
Boeing 707
Boeing 717
Boeing 727
Boeing 737
Boeing 747
Take-Off Thrust Range: Please indicate your minimum and maximum thrust range.
minimum
maximum
0
0
Help
Price: What is your price range? Prices in U.S. dollars
minimum
maximum
0
0
Help
Previous
Next
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FIG.46

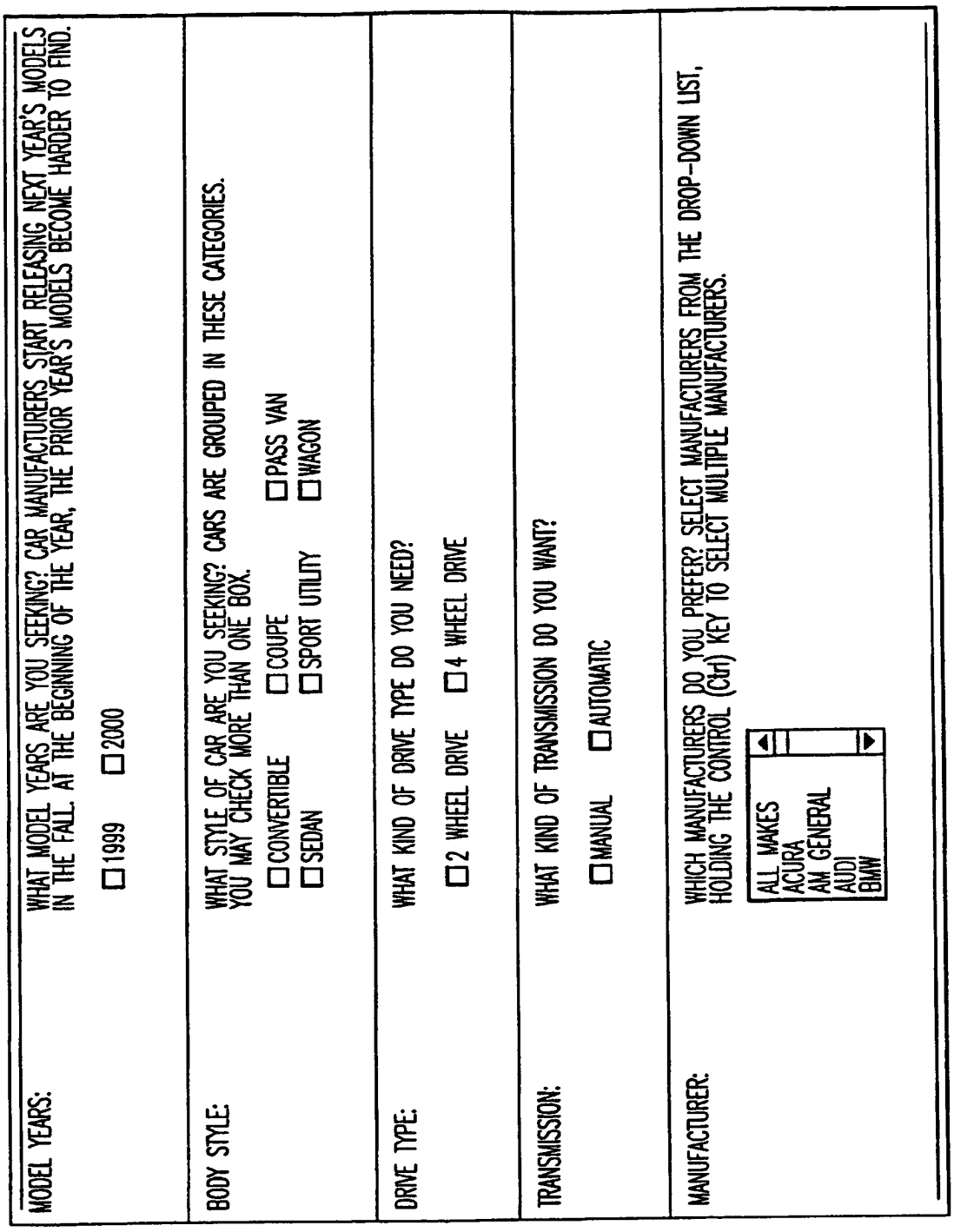
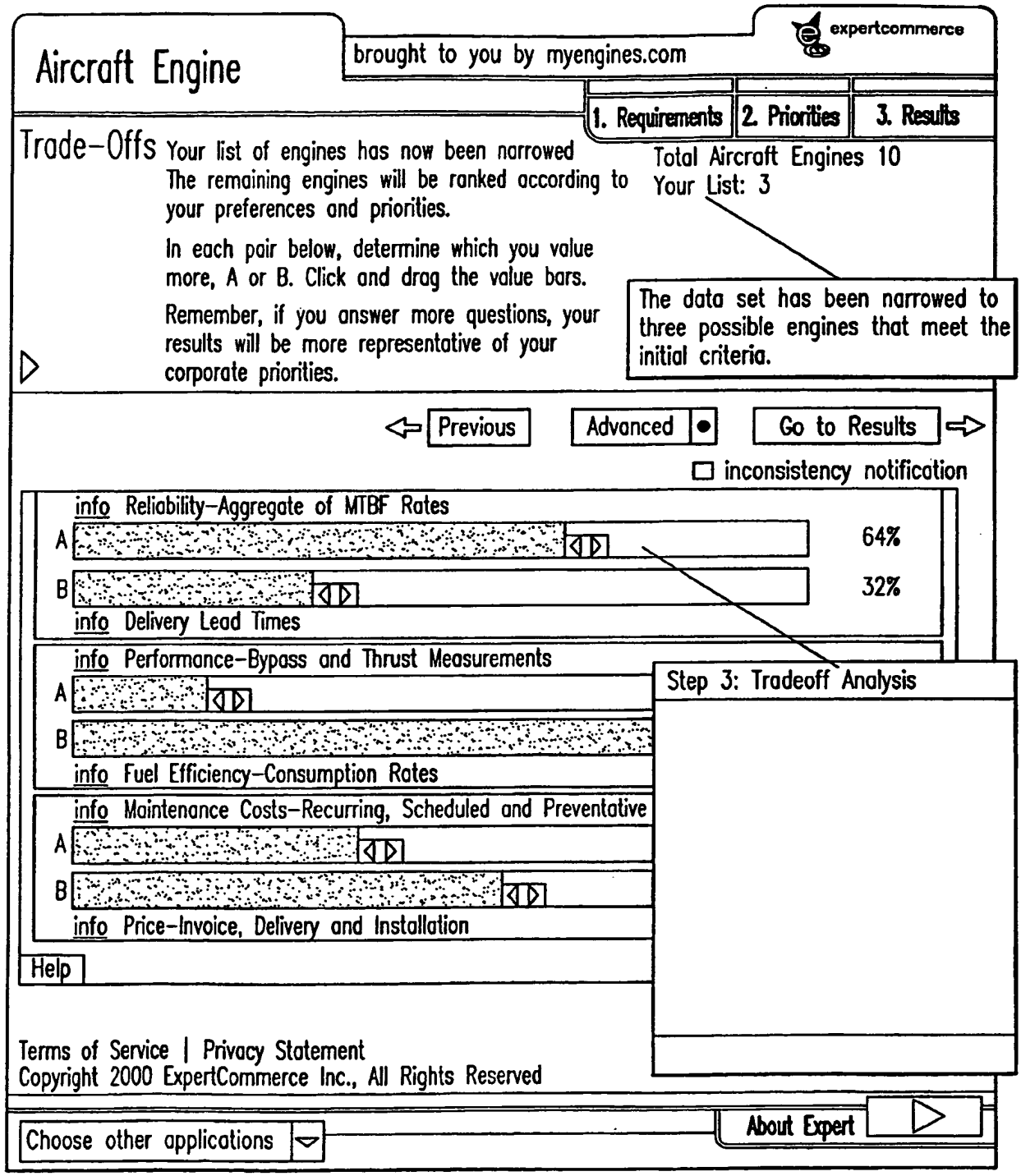

MODEL YEARS:
WHAT MODEL YEARS ARE YOU SEEKING? CAR MANUFACTURERS START RELEASING NEXT YEAR'S MODELS IN THE FALL. AT THE BEGINNING OF THE YEAR, THE PRIOR YEAR'S MODELS BECOME HARDER TO FIND.
☐1999 ☐2000
BODY STYLE:
WHAT STYLE OF CAR ARE YOU SEEKING? CARS ARE GROUPED IN THESE CATEGORIES. YOU MAY CHECK MORE THAN ONE BOX.
☐CONVERTIBLE ☐COUPE ☐PASS VAN
☐SEDAN ☐SPORT UTILITY ☐WAGON
DRIVE TYPE:
WHAT KIND OF DRIVE TYPE DO YOU NEED?
☐2 WHEEL DRIVE ☐4 WHEEL DRIVE
TRANSMISSION:
WHAT KIND OF TRANSMISSION DO YOU WANT?
☐MANUAL ☐AUTOMATIC
MANUFACTURER:
WHICH MANUFACTURERS DO YOU PREFER? SELECT MANUFACTURERS FROM THE DROP-DOWN LIST, HOLDING THE CONTROL (Ctrl) KEY TO SELECT MULTIPLE MANUFACTURERS.
ALL MAKES
ACURA
AM GENERAL
AUDI
BMW

FIG.46A


Aircraft Engine
brought to you by myengines.com
expertcommerce
1. Requirements
2. Priorities
3. Results
Trade-Offs
Your list of engines has now been narrowed
The remaining engines will be ranked according to your preferences and priorities.
In each pair below, determine which you value more, A or B. Click and drag the value bars.
Remember, if you answer more questions, your results will be more representative of your corporate priorities.
Total Aircraft Engines 10
Your List: 3
The data set has been narrowed to three possible engines that meet the initial criteria.
Previous
Advanced
Go to Results
inconsistency notification
info Reliability-Aggregate of MTBF Rates
A
64%
B
32%
info Delivery Lead Times
info Performance-Bypass and Thrust Measurements
A
B
info Fuel Efficiency-Consumption Rates
info Maintenance Costs-Recurring, Scheduled and Preventative
A
B
info Price-Invoice, Delivery and Installation
Step 3: Tradeoff Analysis
Help
Terms of Service | Privacy Statement
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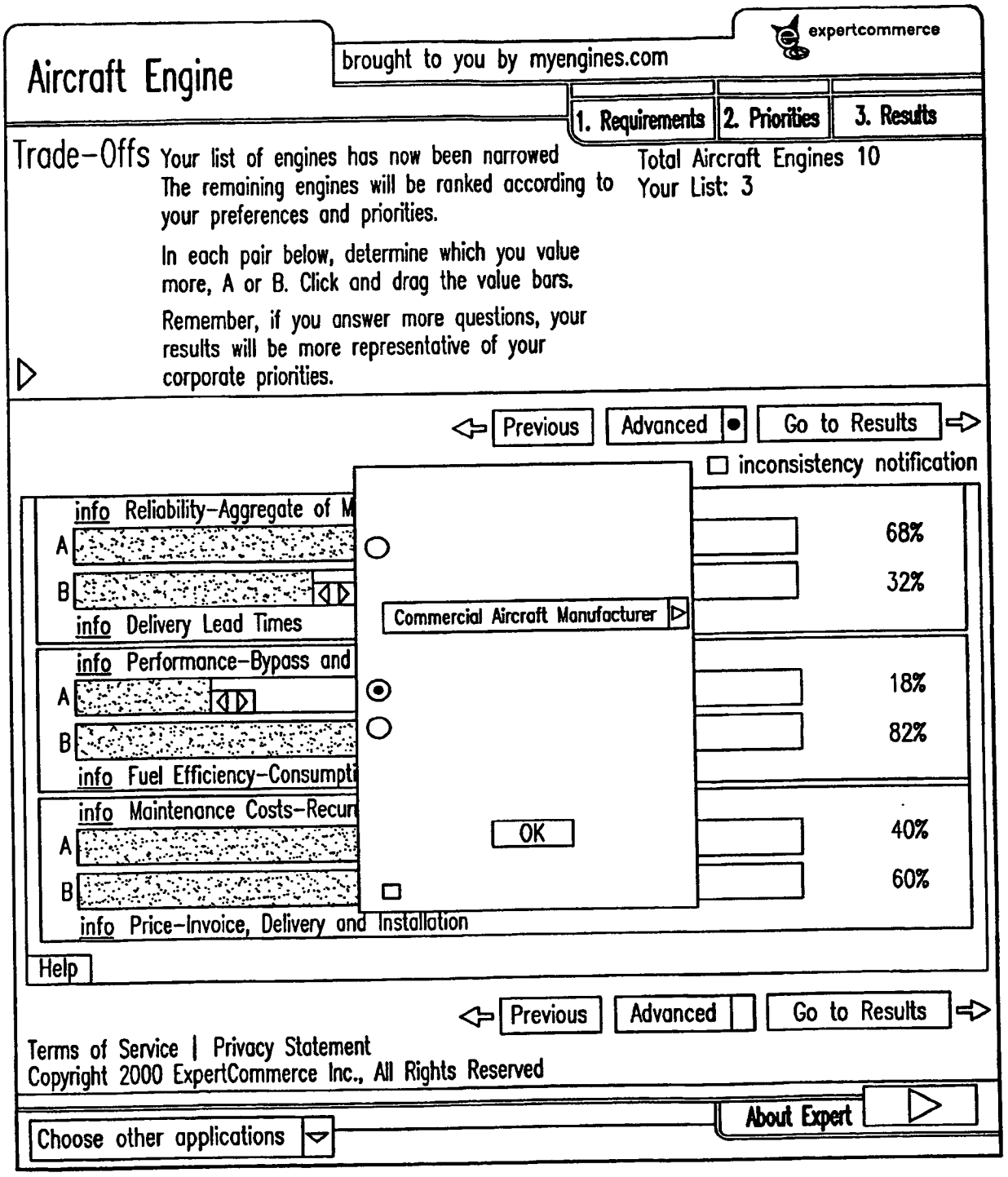
About Expert

FIG.47


Aircraft Engine
brought to you by myengines.com
expertcommerce
1. Requirements
2. Priorities
3. Results
Trade-Offs
Your list of engines has now been narrowed
The remaining engines will be ranked according to your preferences and priorities.
In each pair below, determine which you value more, A or B. Click and drag the value bars.
Remember, if you answer more questions, your results will be more representative of your corporate priorities.
Total Aircraft Engines 10
Your List: 3
Previous
Advanced
Go to Results
inconsistency notification
info Reliability-Aggregate of M
A
B
68%
32%
info Delivery Lead Times
Commercial Aircraft Manufacturer
info Performance-Bypass and
A
B
18%
82%
info Fuel Efficiency-Consumpti
info Maintenance Costs-Recur
A
B
40%
60%
OK
info Price-Invoice, Delivery and Installation
Help
Previous
Advanced
Go to Results
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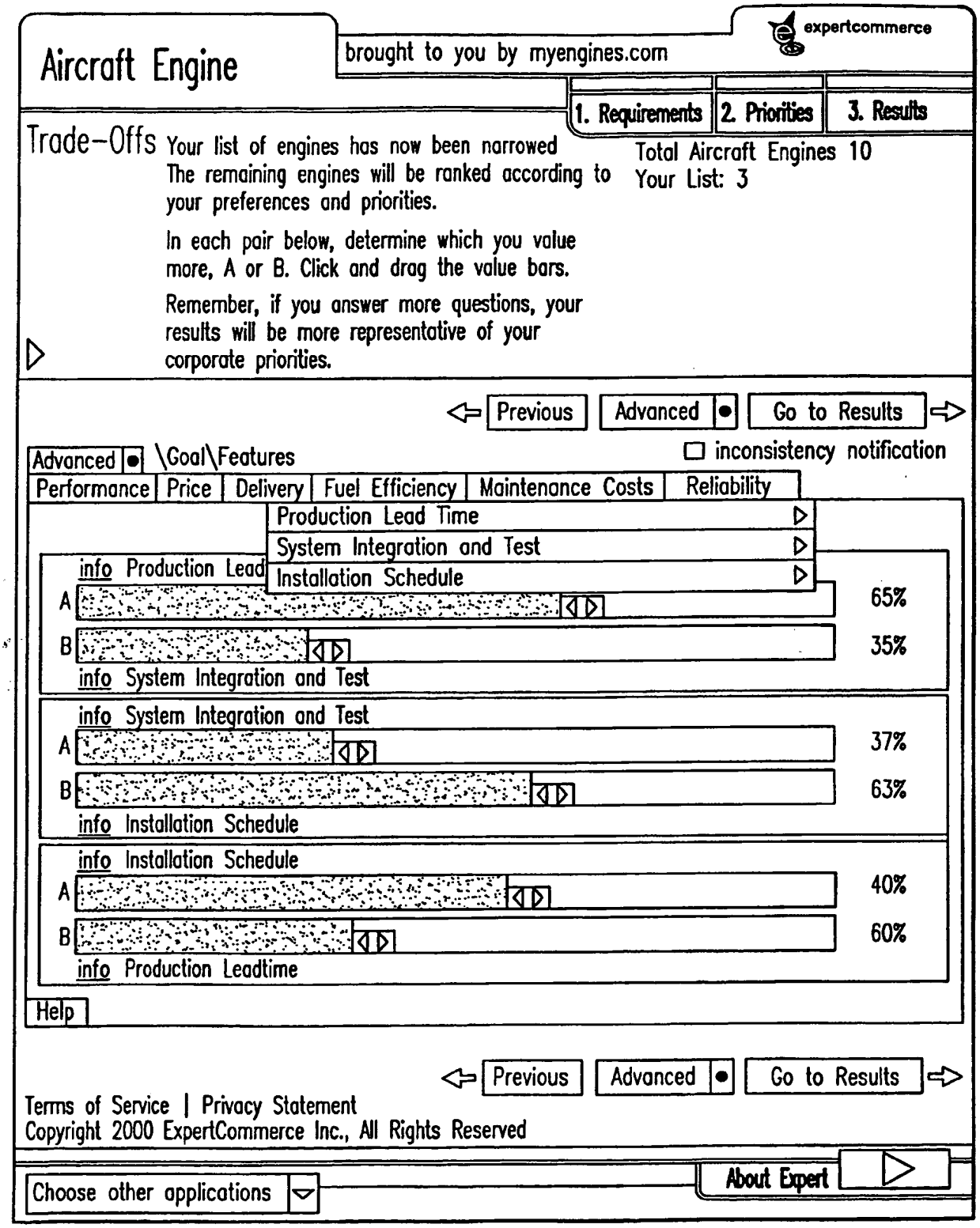
Choose other applications

FIG.48


Aircraft Engine
brought to you by myengines.com
expertcommerce
1. Requirements
2. Priorities
3. Results
Trade-Offs
Your list of engines has now been narrowed
The remaining engines will be ranked according to your preferences and priorities.
In each pair below, determine which you value more, A or B. Click and drag the value bars.
Remember, if you answer more questions, your results will be more representative of your corporate priorities.
Total Aircraft Engines 10
Your List: 3
Previous
Advanced
Go to Results
Advanced
\Goal\Features
inconsistency notification
Performance
Price
Delivery
Fuel Efficiency
Maintenance Costs
Reliability
Production Lead Time
System Integration and Test
Installation Schedule
info Production Lead
A
65%
B
35%
info System Integration and Test
info System Integration and Test
A
37%
B
63%
info Installation Schedule
info Installation Schedule
A
40%
B
60%
info Production Leadtime
Help
Previous
Advanced
Go to Results
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About Expert

FIG.49

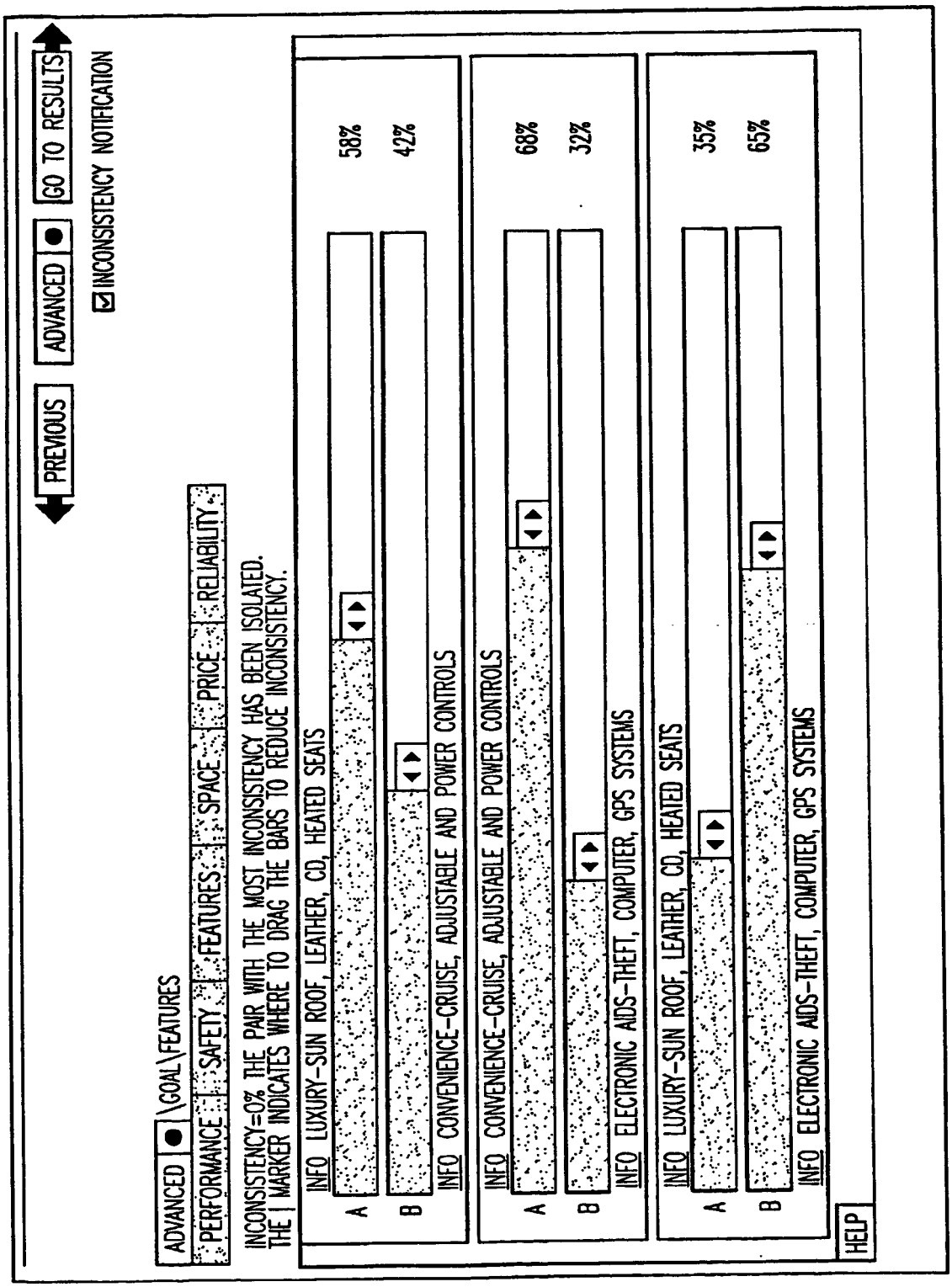
PREVIOUS
ADVANCED
GO TO RESULTS
INCONSISTENCY NOTIFICATION
ADVANCED
GOAL\FEATURES
PERFORMANCE
SAFETY
FEATURES
SPACE
PRICE
RELIABILITY
INCONSISTENCY=0% THE PAIR WITH THE MOST INCONSISTENCY HAS BEEN ISOLATED.
THE | MARKER INDICATES WHERE TO DRAG THE BARS TO REDUCE INCONSISTENCY.
INFO LUXURY-SUN ROOF, LEATHER, CD, HEATED SEATS
A
58%
B
42%
INFO CONVENIENCE-CRUISE, ADJUSTABLE AND POWER CONTROLS
INFO CONVENIENCE-CRUISE, ADJUSTABLE AND POWER CONTROLS
A
68%
B
32%
INFO ELECTRONIC AIDS-THEFT, COMPUTER, GPS SYSTEMS
INFO LUXURY-SUN ROOF, LEATHER, CD, HEATED SEATS
A
35%
B
65%
INFO ELECTRONIC AIDS-THEFT, COMPUTER, GPS SYSTEMS
HELP

FIG.49A

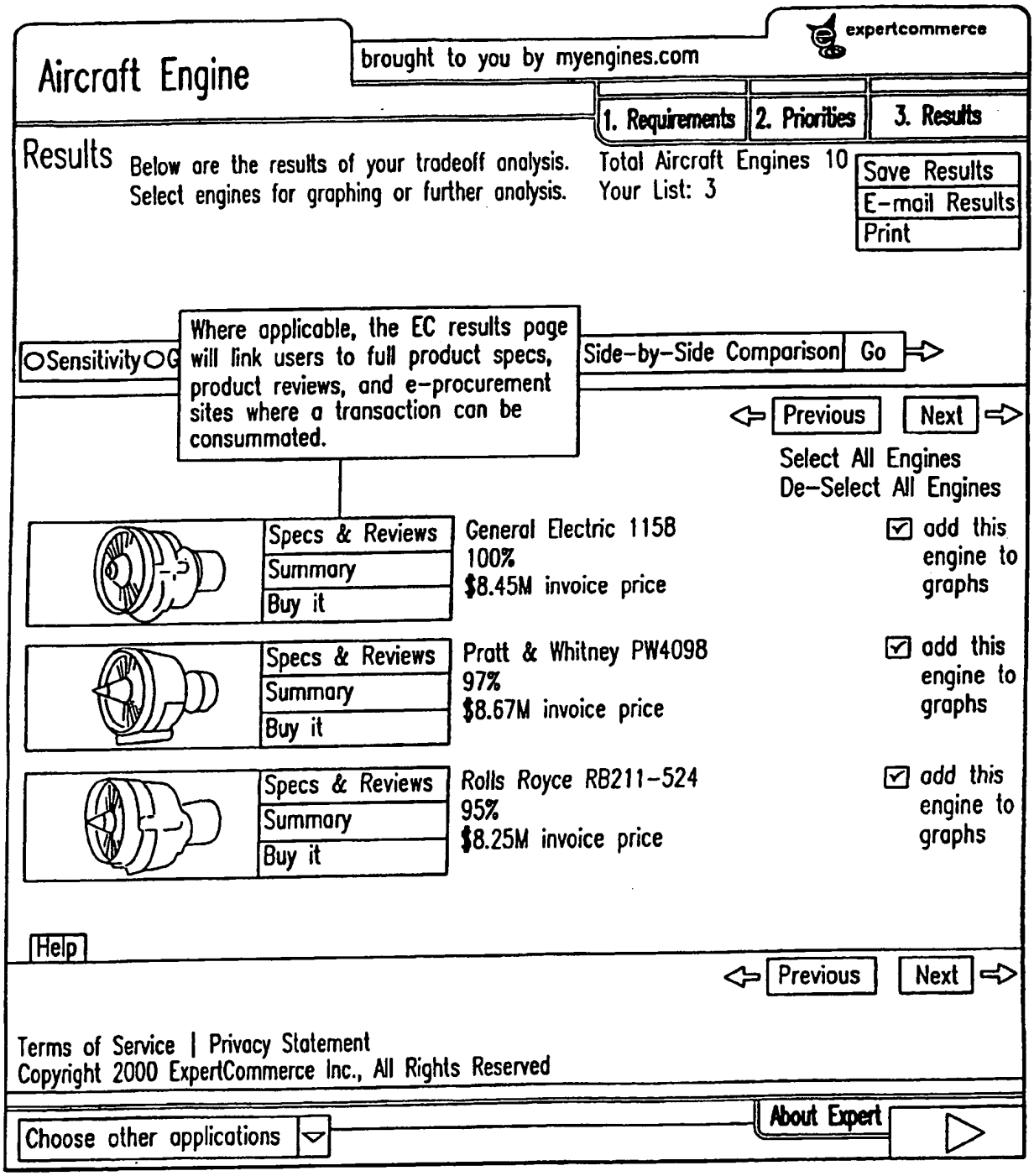
Aircraft Engine
brought to you by myengines.com
expertcommerce
1. Requirements
2. Priorities
3. Results
Results
Below are the results of your tradeoff analysis.
Select engines for graphing or further analysis.
Total Aircraft Engines 10
Your List: 3
Save Results
E-mail Results
Print
Where applicable, the EC results page will link users to full product specs, product reviews, and e-procurement sites where a transaction can be consummated.
Sensitivity
Side-by-Side Comparison
Go
Previous
Next
Select All Engines
De-Select All Engines
Specs & Reviews
Summary
Buy it
General Electric 1158
100%
$8.45M invoice price
add this engine to graphs
Pratt & Whitney PW4098
97%
$8.67M invoice price
Rolls Royce RB211-524
95%
$8.25M invoice price
Help
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FIG.50

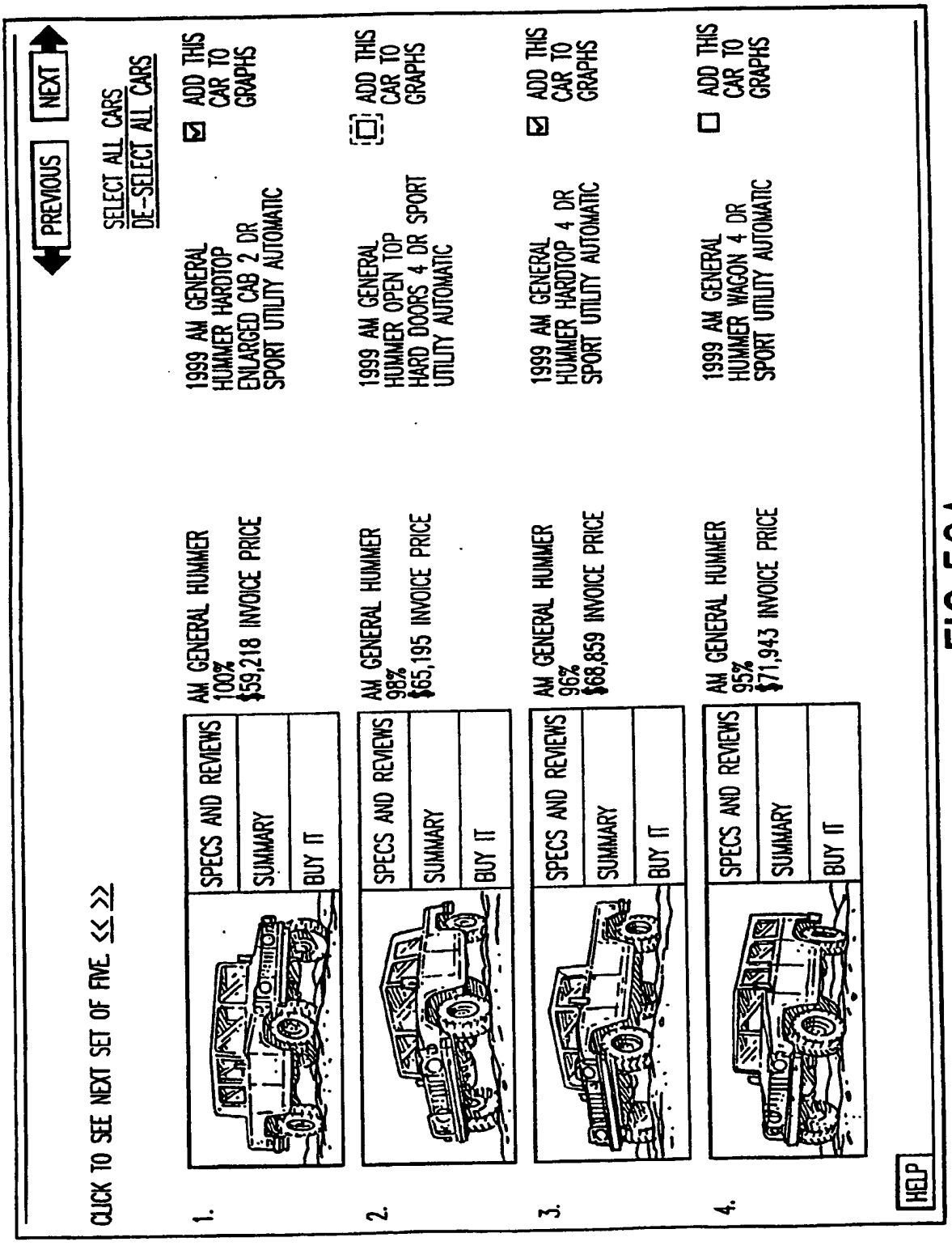
PREVIOUS
NEXT
CLICK TO SEE NEXT SET OF FIVE << >>
SELECT ALL CARS
DE-SELECT ALL CARS
1.
SPECS AND REVIEWS
SUMMARY
BUY IT
AM GENERAL HUMMER
100%
$59,218 INVOICE PRICE
1999 AM GENERAL
HUMMER HARDTOP
ENLARGED CAB 2 DR
SPORT UTILITY AUTOMATIC
ADD THIS CAR TO GRAPHS
2.
SPECS AND REVIEWS
SUMMARY
BUY IT
AM GENERAL HUMMER
98%
$65,195 INVOICE PRICE
1999 AM GENERAL
HUMMER OPEN TOP
HARD DOORS 4 DR SPORT
UTILITY AUTOMATIC
ADD THIS CAR TO GRAPHS
3.
SPECS AND REVIEWS
SUMMARY
BUY IT
AM GENERAL HUMMER
96%
$68,859 INVOICE PRICE
1999 AM GENERAL
HUMMER HARDTOP 4 DR
SPORT UTILITY AUTOMATIC
ADD THIS CAR TO GRAPHS
4.
SPECS AND REVIEWS
SUMMARY
BUY IT
AM GENERAL HUMMER
95%
$71,943 INVOICE PRICE
1999 AM GENERAL
HUMMER WAGON 4 DR
SPORT UTILITY AUTOMATIC
ADD THIS CAR TO GRAPHS
HELP

FIG.50A

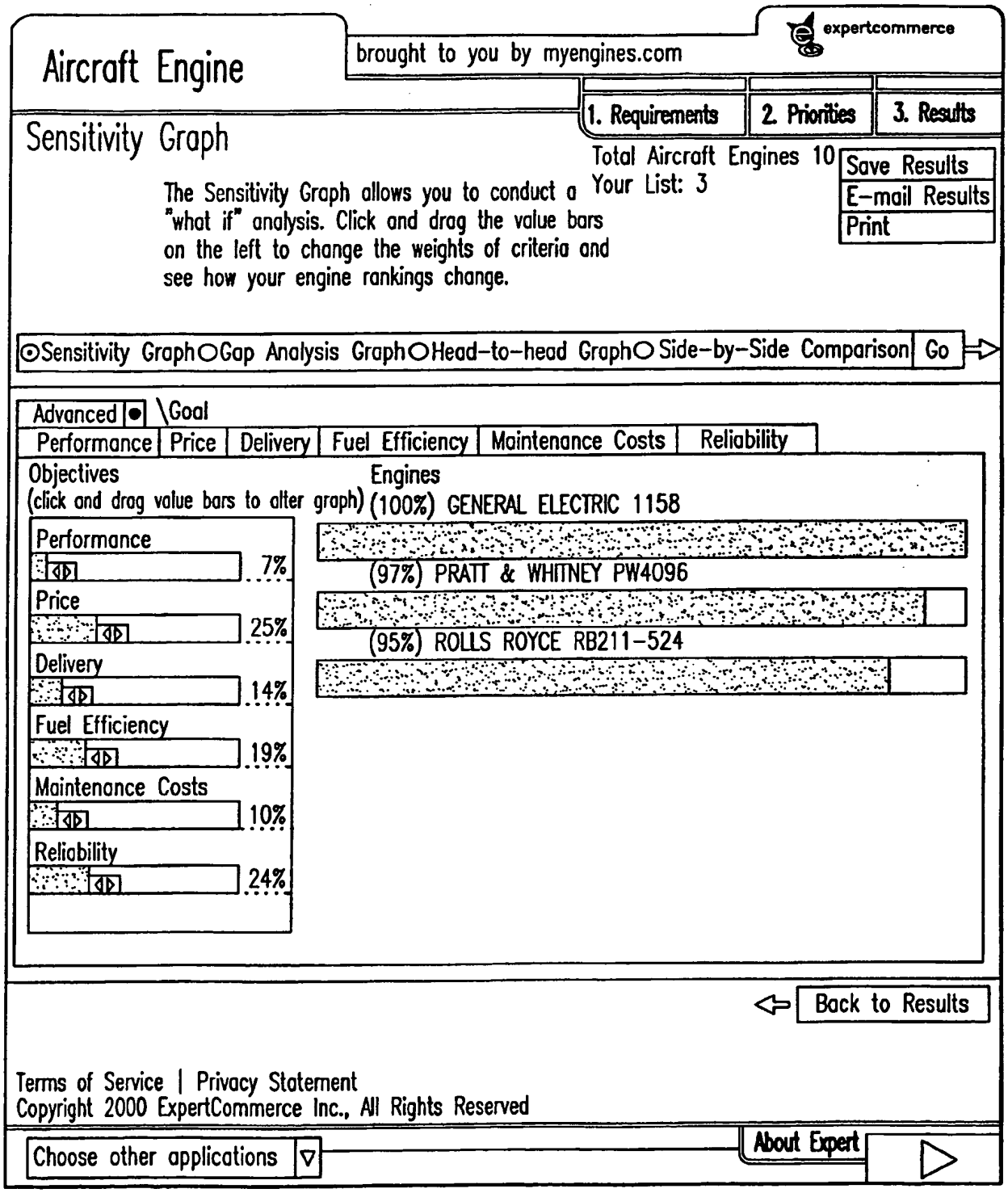
Aircraft Engine
brought to you by myengines.com
expertcommerce
1. Requirements
2. Priorities
3. Results
Sensitivity Graph
Total Aircraft Engines 10
Your List: 3
Save Results
E-mail Results
Print
The Sensitivity Graph allows you to conduct a "what if" analysis. Click and drag the value bars on the left to change the weights of criteria and see how your engine rankings change.
Sensitivity Graph Gap Analysis Graph Head-to-head Graph Side-by-Side Comparison
Go
Advanced
Goal
Performance
Price
Delivery
Fuel Efficiency
Maintenance Costs
Reliability
Objectives
(click and drag value bars to alter graph)
Performance 7%
Price 25%
Delivery 14%
Fuel Efficiency 19%
Maintenance Costs 10%
Reliability 24%
Engines
(100%) GENERAL ELECTRIC 1158
(97%) PRATT & WHITNEY PW4096
(95%) ROLLS ROYCE RB211-524
Back to Results
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FIG.51

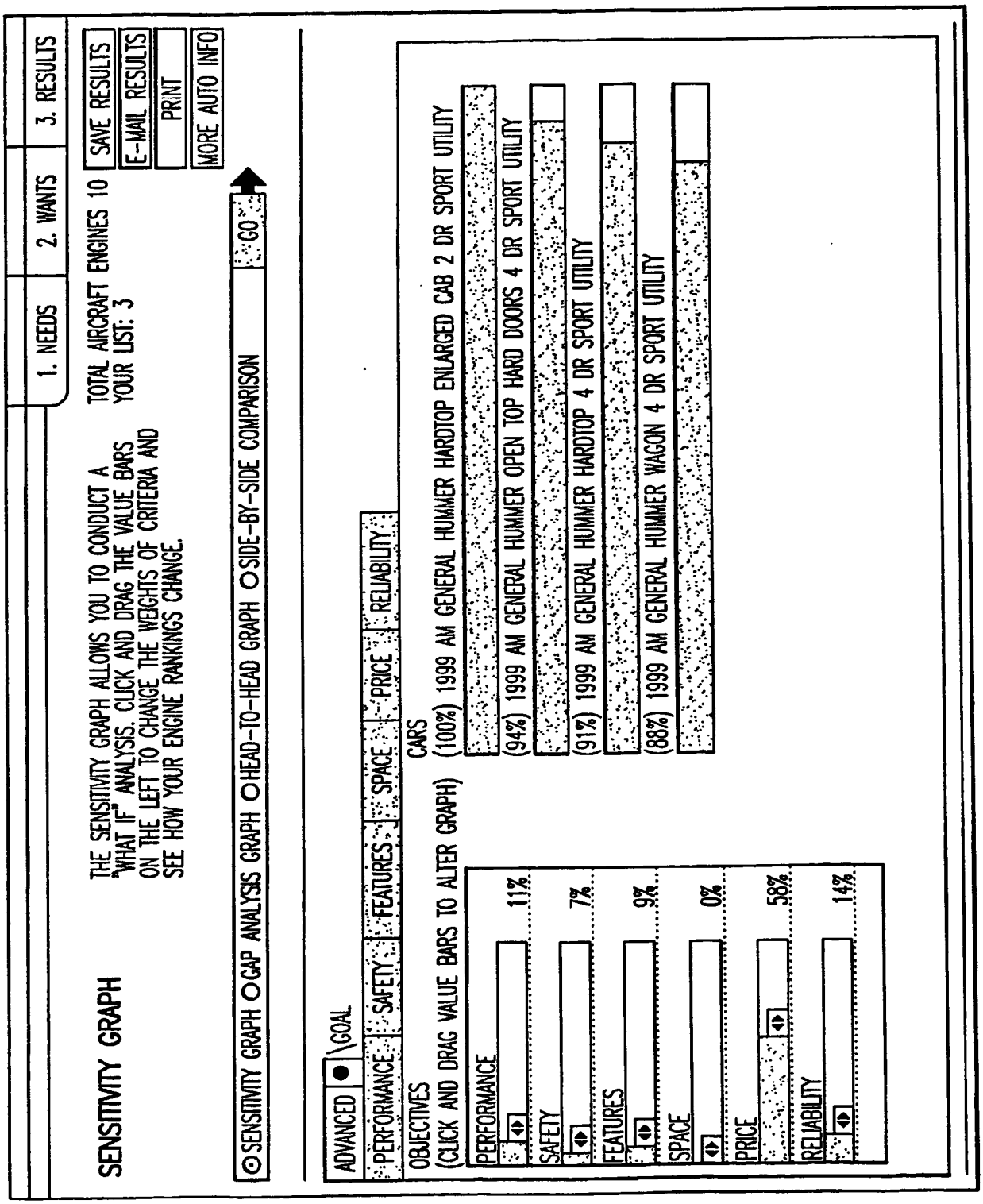
1. NEEDS
2. WANTS
3. RESULTS
SENSITIVITY GRAPH
THE SENSITIVITY GRAPH ALLOWS YOU TO CONDUCT A "WHAT IF" ANALYSIS. CLICK AND DRAG THE VALUE BARS ON THE LEFT TO CHANGE THE WEIGHTS OF CRITERIA AND SEE HOW YOUR ENGINE RANKINGS CHANGE.
TOTAL AIRCRAFT ENGINES 10
YOUR LIST: 3
SAVE RESULTS
E-MAIL RESULTS
PRINT
MORE AUTO INFO
SENSITIVITY GRAPH GAP ANALYSIS GRAPH HEAD-TO-HEAD GRAPH SIDE-BY-SIDE COMPARISON
GO
ADVANCED
GOAL
PERFORMANCE
SAFETY
FEATURES
SPACE
PRICE
RELIABILITY
OBJECTIVES
(CLICK AND DRAG VALUE BARS TO ALTER GRAPH)
CARS
PERFORMANCE 11%
SAFETY 7%
FEATURES 9%
SPACE 0%
PRICE 58%
RELIABILITY 14%
(100%) 1999 AM GENERAL HUMMER HARDTOP ENLARGED CAB 2 DR SPORT UTILITY
(94%) 1999 AM GENERAL HUMMER OPEN TOP HARD DOORS 4 DR SPORT UTILITY
(91%) 1999 AM GENERAL HUMMER HARDTOP 4 DR SPORT UTILITY
(88%) 1999 AM GENERAL HUMMER WAGON 4 DR SPORT UTILITY

FIG.51A

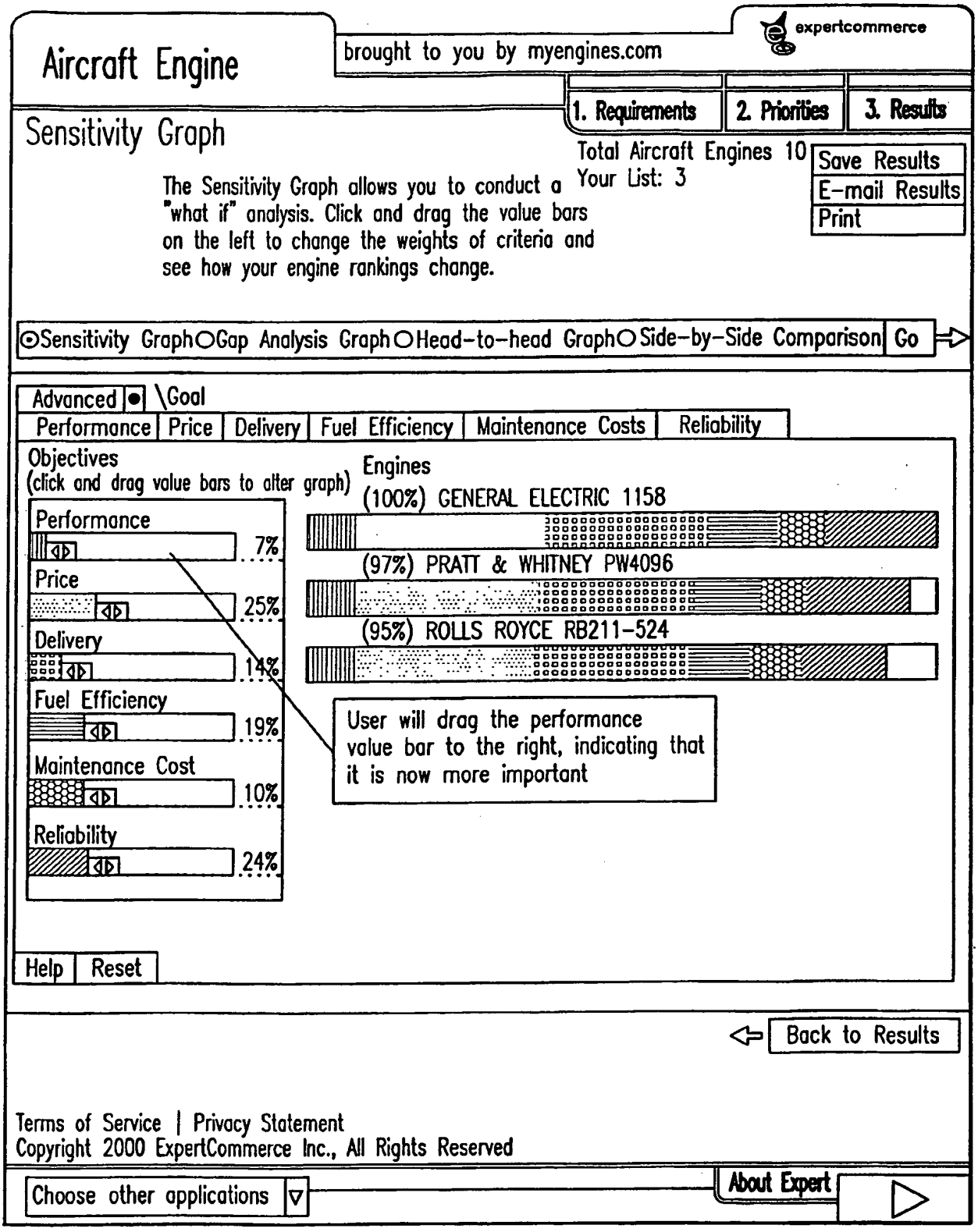
Aircraft Engine
brought to you by myengines.com
expertcommerce
1. Requirements
2. Priorities
3. Results
Sensitivity Graph
Total Aircraft Engines 10
Your List: 3
Save Results
E-mail Results
Print
The Sensitivity Graph allows you to conduct a "what if" analysis. Click and drag the value bars on the left to change the weights of criteria and see how your engine rankings change.
Sensitivity Graph Gap Analysis Graph Head-to-head Graph Side-by-Side Comparison
Go
Advanced
Goal
Performance
Price
Delivery
Fuel Efficiency
Maintenance Costs
Reliability
Objectives
(click and drag value bars to alter graph)
Performance 7%
Price 25%
Delivery 14%
Fuel Efficiency 19%
Maintenance Cost 10%
Reliability 24%
Engines
(100%) GENERAL ELECTRIC 1158
(97%) PRATT & WHITNEY PW4096
(95%) ROLLS ROYCE RB211-524
User will drag the performance value bar to the right, indicating that it is now more important
Help
Reset
Back to Results
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FIG.52

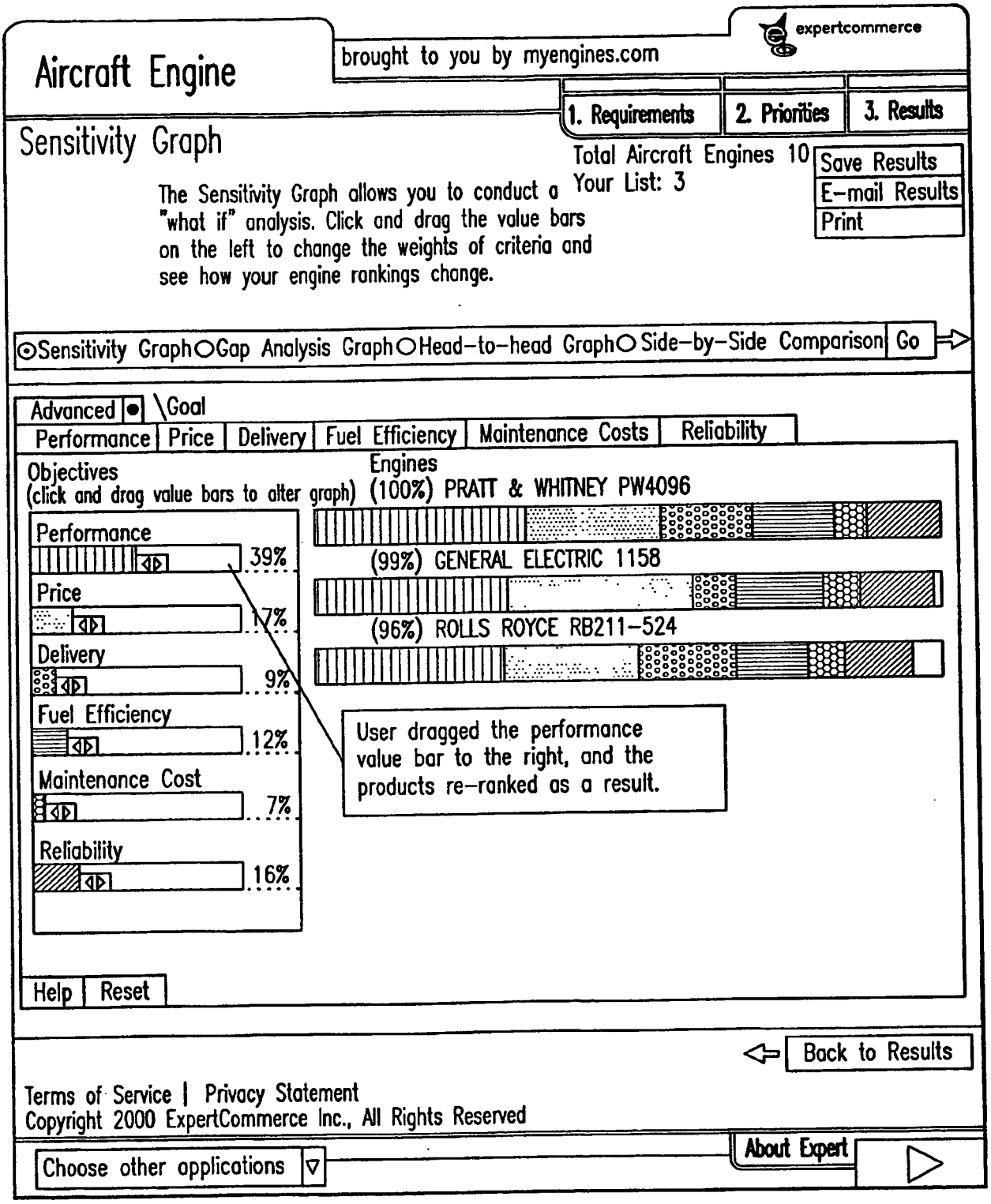
Aircraft Engine
brought to you by myengines.com
expertcommerce
1. Requirements
2. Priorities
3. Results
Sensitivity Graph
Total Aircraft Engines 10
Your List: 3
Save Results
E-mail Results
Print
The Sensitivity Graph allows you to conduct a "what if" analysis. Click and drag the value bars on the left to change the weights of criteria and see how your engine rankings change.
Sensitivity Graph Gap Analysis Graph Head-to-head Graph Side-by-Side Comparison Go
Advanced Goal
Performance Price Delivery Fuel Efficiency Maintenance Costs Reliability
Objectives
(click and drag value bars to alter graph)
Performance 39%
Price 17%
Delivery 9%
Fuel Efficiency 12%
Maintenance Cost 7%
Reliability 16%
Engines
(100%) PRATT & WHITNEY PW4096
(99%) GENERAL ELECTRIC 1158
(96%) ROLLS ROYCE RB211-524
User dragged the performance value bar to the right, and the products re-ranked as a result.
Help
Reset
Back to Results
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FIG.53

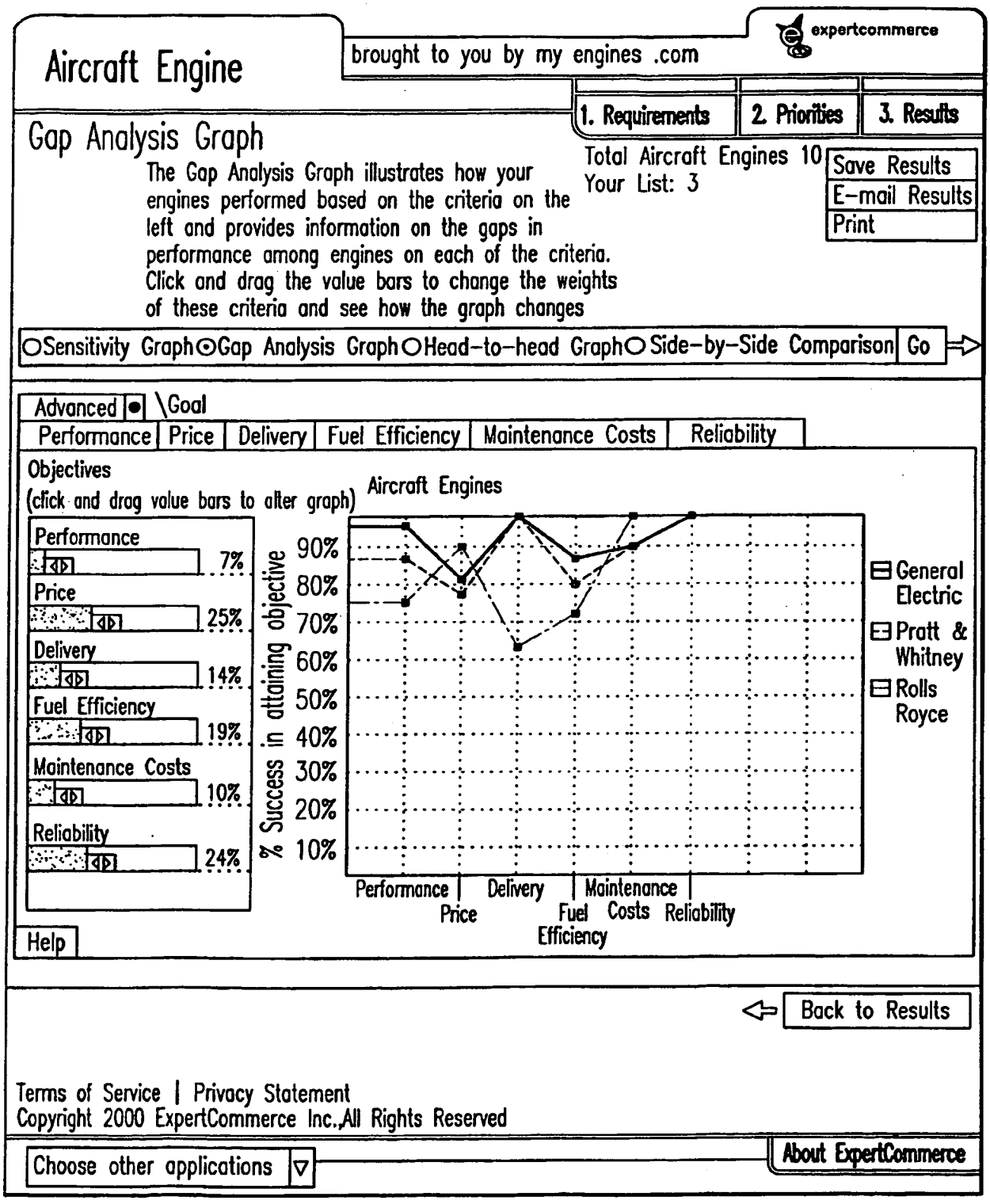
Aircraft Engine
brought to you by my engines .com
expertcommerce
1. Requirements
2. Priorities
3. Results
Gap Analysis Graph
The Gap Analysis Graph illustrates how your engines performed based on the criteria on the left and provides information on the gaps in performance among engines on each of the criteria. Click and drag the value bars to change the weights of these criteria and see how the graph changes
Total Aircraft Engines 10
Your List: 3
Save Results
E-mail Results
Print
Sensitivity Graph Gap Analysis Graph Head-to-head Graph Side-by-Side Comparison
Go
Advanced
\Goal
Performance
Price
Delivery
Fuel Efficiency
Maintenance Costs
Reliability
Objectives
(click and drag value bars to alter graph)
Performance 7%
Price 25%
Delivery 14%
Fuel Efficiency 19%
Maintenance Costs 10%
Reliability 24%
Aircraft Engines
% Success in attaining objective
90%
80%
70%
60%
50%
40%
30%
20%
10%
Performance
Price
Delivery
Fuel Efficiency
Maintenance Costs
Reliability
General Electric
Pratt & Whitney
Rolls Royce
Help
Back to Results
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FIG.54

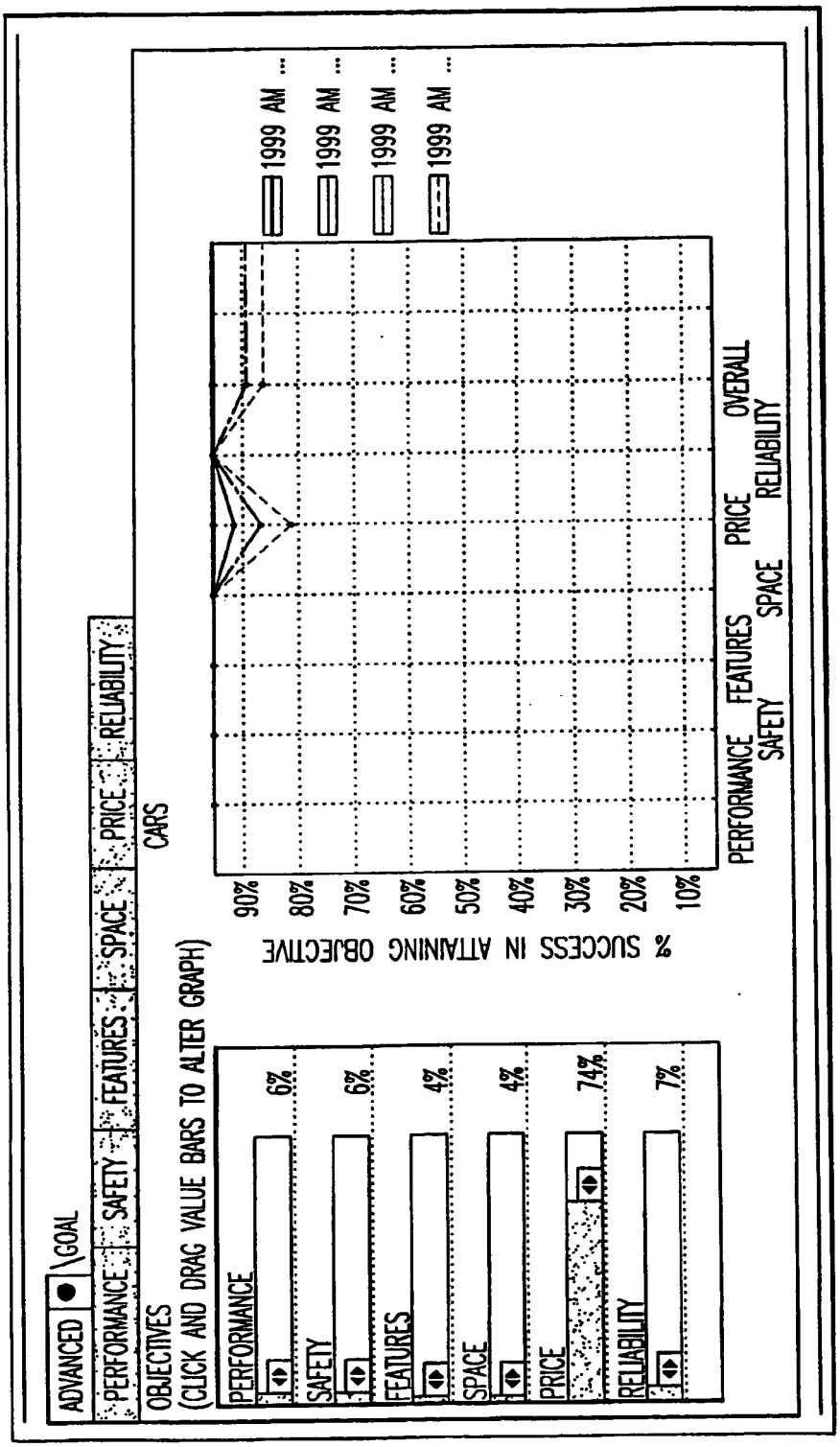
ADVANCED
GOAL
PERFORMANCE
SAFETY
FEATURES
SPACE
PRICE
RELIABILITY
OBJECTIVES
(CLICK AND DRAG VALUE BARS TO ALTER GRAPH)
PERFORMANCE 6%
SAFETY 6%
FEATURES 4%
SPACE 4%
PRICE 74%
RELIABILITY 7%
CARS
% SUCCESS IN ATTAINING OBJECTIVE
90%
80%
70%
60%
50%
40%
30%
20%
10%
1999 AM ...
1999 AM ...
1999 AM ...
1999 AM ...
PERFORMANCE
FEATURES
SPACE
PRICE
OVERALL
SAFETY
RELIABILITY

FIG.54A

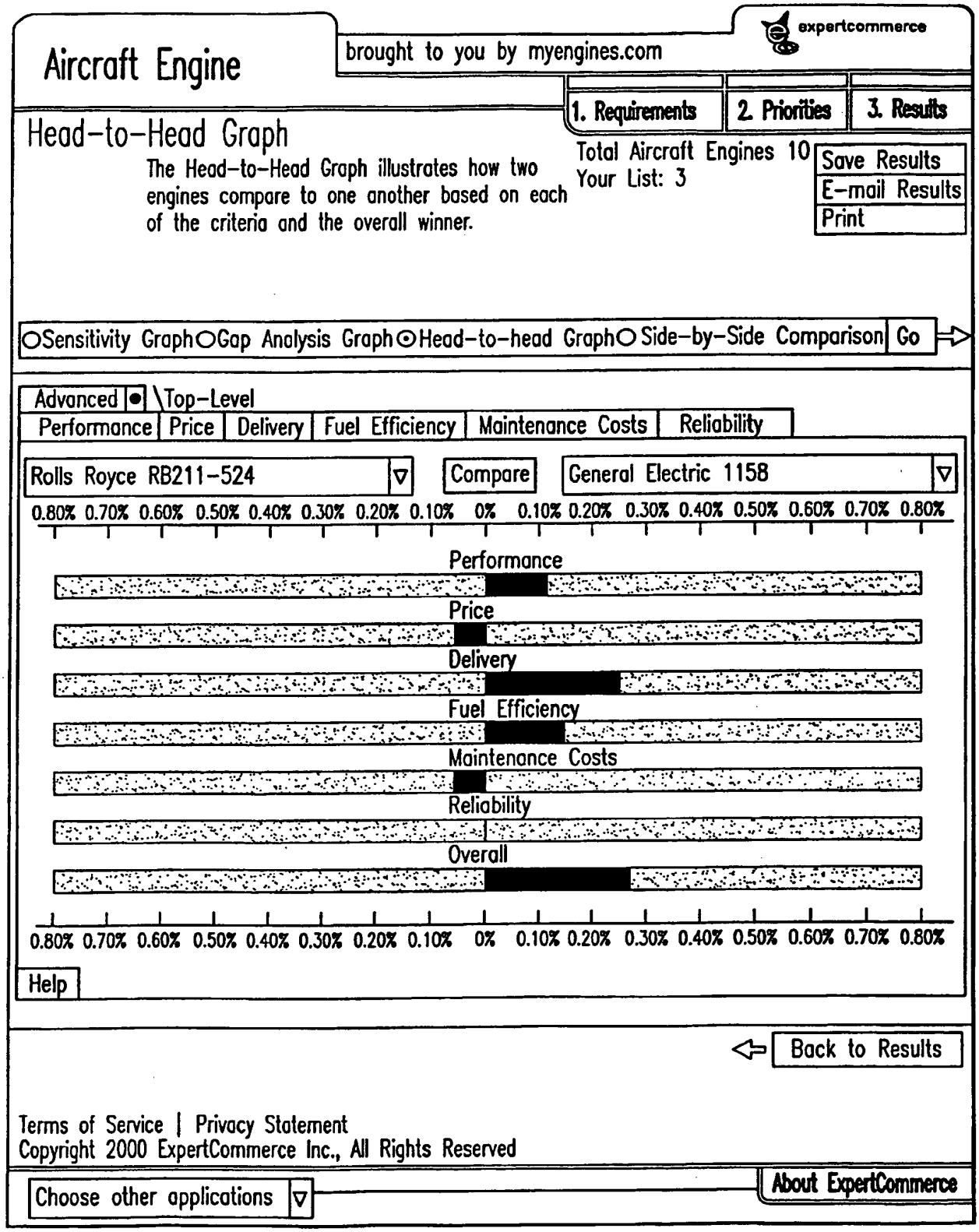
Aircraft Engine
brought to you by myengines.com
expertcommerce
1. Requirements
2. Priorities
3. Results
Head-to-Head Graph
The Head-to-Head Graph illustrates how two engines compare to one another based on each of the criteria and the overall winner.
Total Aircraft Engines 10
Your List: 3
Save Results
E-mail Results
Print
Sensitivity Graph
Gap Analysis Graph
Head-to-head Graph
Side-by-Side Comparison
Go
Advanced
Top-Level
Performance
Price
Delivery
Fuel Efficiency
Maintenance Costs
Reliability
Rolls Royce RB211-524
Compare
General Electric 1158
0.80% 0.70% 0.60% 0.50% 0.40% 0.30% 0.20% 0.10% 0% 0.10% 0.20% 0.30% 0.40% 0.50% 0.60% 0.70% 0.80%
Performance
Price
Delivery
Fuel Efficiency
Maintenance Costs
Reliability
Overall
0.80% 0.70% 0.60% 0.50% 0.40% 0.30% 0.20% 0.10% 0% 0.10% 0.20% 0.30% 0.40% 0.50% 0.60% 0.70% 0.80%
Help
Back to Results
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FIG.55

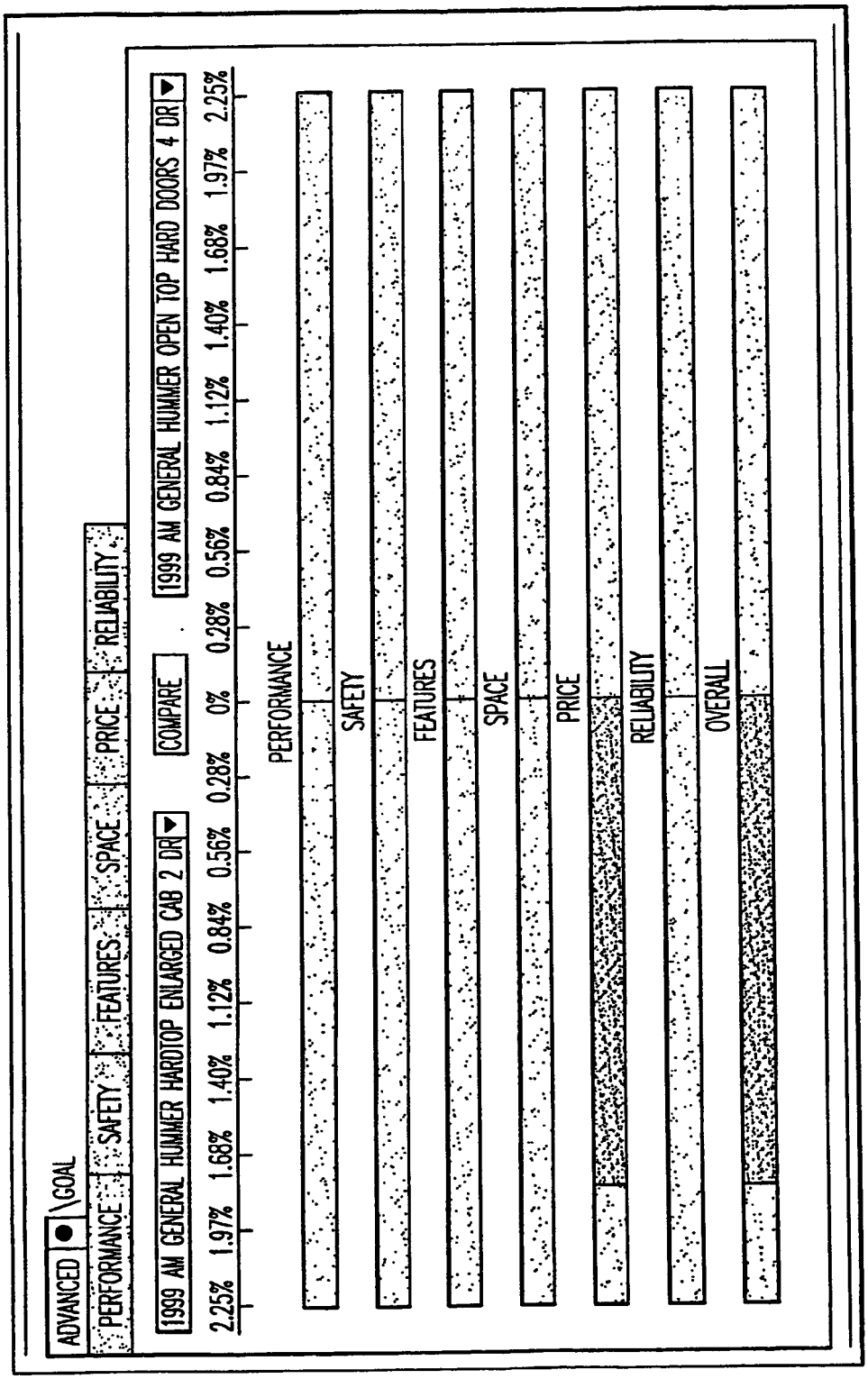

ADVANCED
GOAL
PERFORMANCE
SAFETY
FEATURES
SPACE
PRICE
RELIABILITY
1999 AM GENERAL HUMMER HARDTOP ENLARGED CAB 2 DR
COMPARE
1999 AM GENERAL HUMMER OPEN TOP HARD DOORS 4 DR
2.25% 1.97% 1.68% 1.40% 1.12% 0.84% 0.56% 0.28% 0% 0.28% 0.56% 0.84% 1.12% 1.40% 1.68% 1.97% 2.25%
PERFORMANCE
SAFETY
FEATURES
SPACE
PRICE
RELIABILITY
OVERALL

FIG.55A

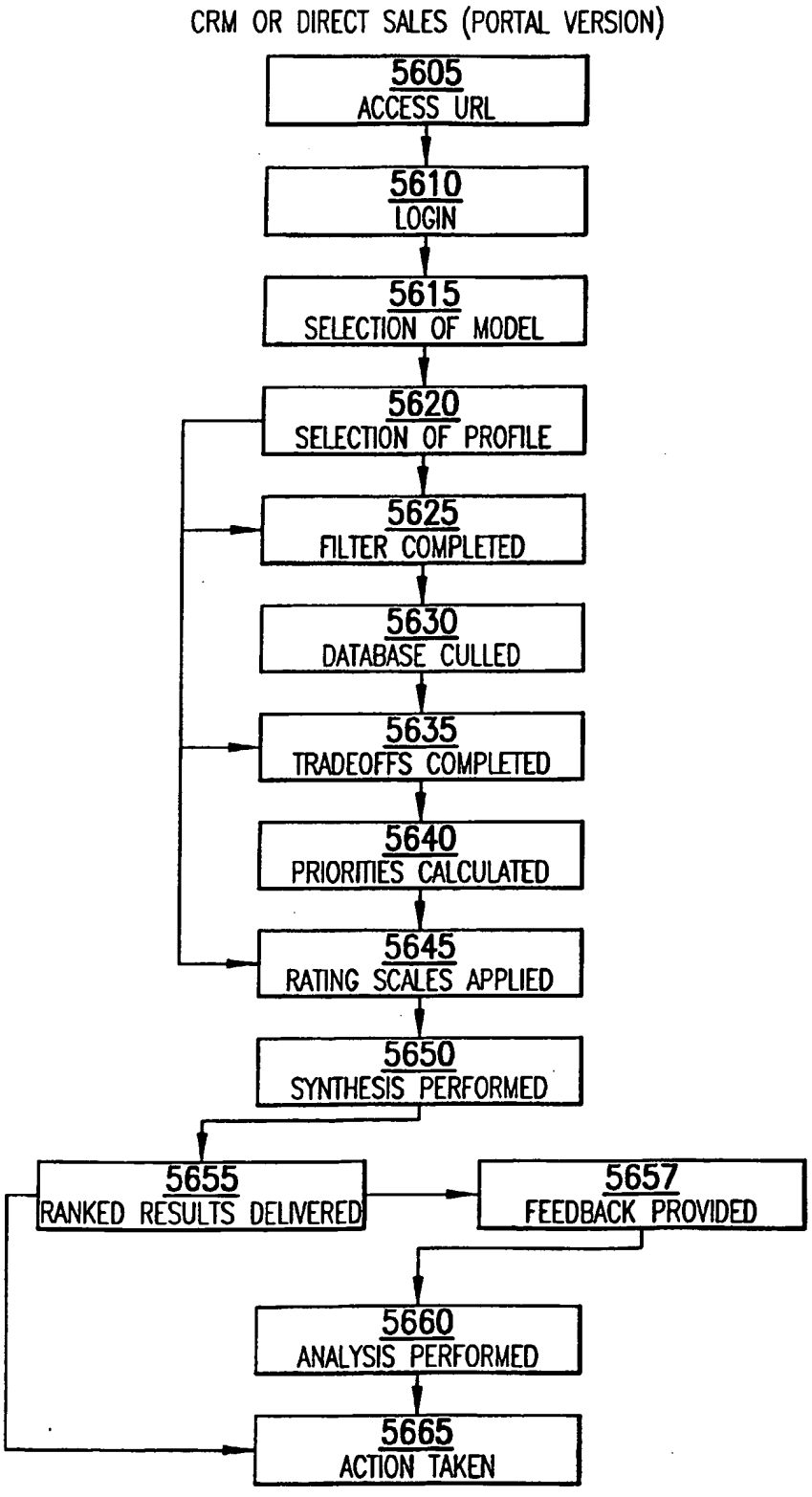
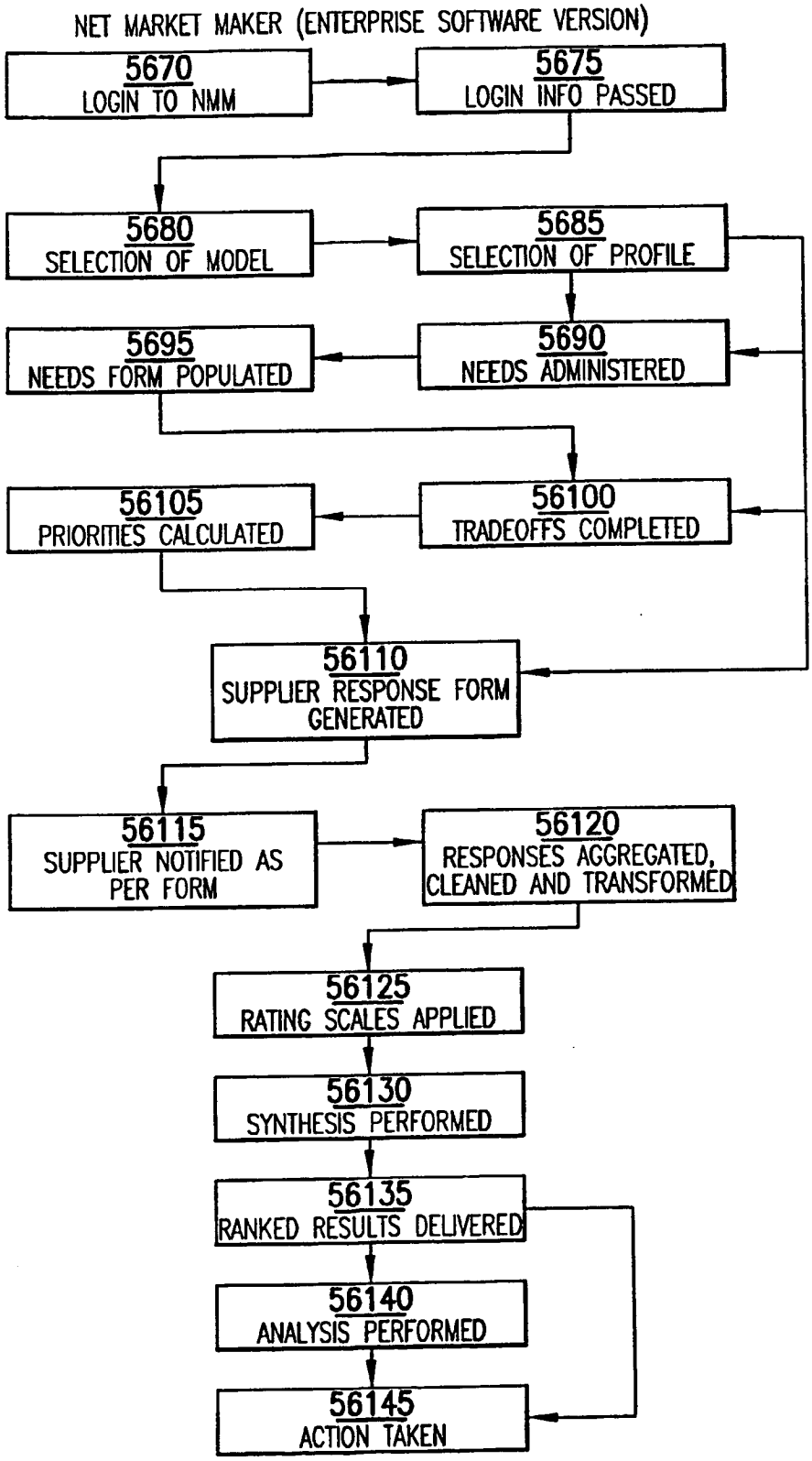

CRM OR DIRECT SALES (PORTAL VERSION)
5605
ACCESS URL
5610
LOGIN
5615
SELECTION OF MODEL
5620
SELECTION OF PROFILE
5625
FILTER COMPLETED
5630
DATABASE CULLED
5635
TRADEOFFS COMPLETED
5640
PRIORITIES CALCULATED
5645
RATING SCALES APPLIED
5650
SYNTHESIS PERFORMED
5655
RANKED RESULTS DELIVERED
5657
FEEDBACK PROVIDED
5660
ANALYSIS PERFORMED
5665
ACTION TAKEN

FIG.56A


NET MARKET MAKER (ENTERPRISE SOFTWARE VERSION)
5670
LOGIN TO NMM
5675
LOGIN INFO PASSED
5680
SELECTION OF MODEL
5685
SELECTION OF PROFILE
5695
NEEDS FORM POPULATED
5690
NEEDS ADMINISTERED
56105
PRIORITIES CALCULATED
56100
TRADEOFFS COMPLETED
56110
SUPPLIER RESPONSE FORM GENERATED
56115
SUPPLIER NOTIFIED AS PER FORM
56120
RESPONSES AGGREGATED, CLEANED AND TRANSFORMED
56125
RATING SCALES APPLIED
56130
SYNTHESIS PERFORMED
56135
RANKED RESULTS DELIVERED
56140
ANALYSIS PERFORMED
56145
ACTION TAKEN

CRM OR DIRECT SALES (PORTAL VERSION)

5605 ACCESS URL	5610 LOGIN	5615 SELECTION OF MODEL	5620 SELECTION OF PROFILE	5625 FILTER COMPLETED	5630 DATABASE CULLED	5635 TRADEOFFS COMPLETED	5640 PRIORITIES CALCULATED
FIGURE 1	FIGURE 7	FIGURE 3 FIGURE 4	FIGURE 11 FIGURE 12	FIGURE 10		FIGURE 6 FIGURE 9 FIGURE 14 FIGURE 20	FIGURE 21A & B FIGURE 22 FIGURE 23

5645 RATING SCALES APPLIED	5650 SYNTHESIS PERFORMED	5655 RANKED RESULTS DELIVERED	5657 FEEDBACK PROVIDED	5660 ANALYSIS PERFORMED	5665 ACTION TAKEN
FIGURE 19 FIGURE 25 FIGURE 26	FIGURE 24		FIGURE 27	FIGURE 8 FIGURE 15 FIGURE 16 FIGURE 17 FIGURE 18 FIGURE 20	

FIG.57A

SUBSTITUTE SHEET (RULE 26)

NET MARKET MAKER (ENTERPRISE SOFTWARE VERSION)

5670 LOGIN TO NMM	5675 LOGIN INFO PASSED	5680 SELECTION OF MODEL	5685 SELECTION OF PROFILE	5690 NEEDS ADMINISTRATED	5695 NEEDS FORM POPULATED	56100 TRADEOFFS COMPLETED	56105 PRIORITIES CALCULATED
FIGURE 28 FIGURE 29 FIGURE 45	FIGURE 30 FIGURE 30A			FIGURE 46		FIGURE 33 FIGURE 39 FIGURE 47 FIGURE 48 FIGURE 49	
56110 SUPPLIER RESPONSE FORM GENERATED	56115 SUPPLIER NOTIFIED AS PER FORM	56120 RESPONSES AGGREGATED, CLEANED AND TRANSFORMED	56125 RATING SCALES APPLIED	56130 SYNTHESIS PERFORMED	56135 RANKED RESULTS DELIVERED	56140 ANALYSIS PERFORMED	56145 ACTION TAKEN
FIGURE 32	FIGURE 30B	FIGURE 34 FIGURE 35	FIGURE 36 FIGURE 40	FIGURE 36a,b,c&d	FIGURE 41 FIGURE 50	FIGURE 37 FIGURE 42 FIGURE 43 FIGURE 44 FIGURE 51,52,53 FIGURE 54,55	

FIG.57B

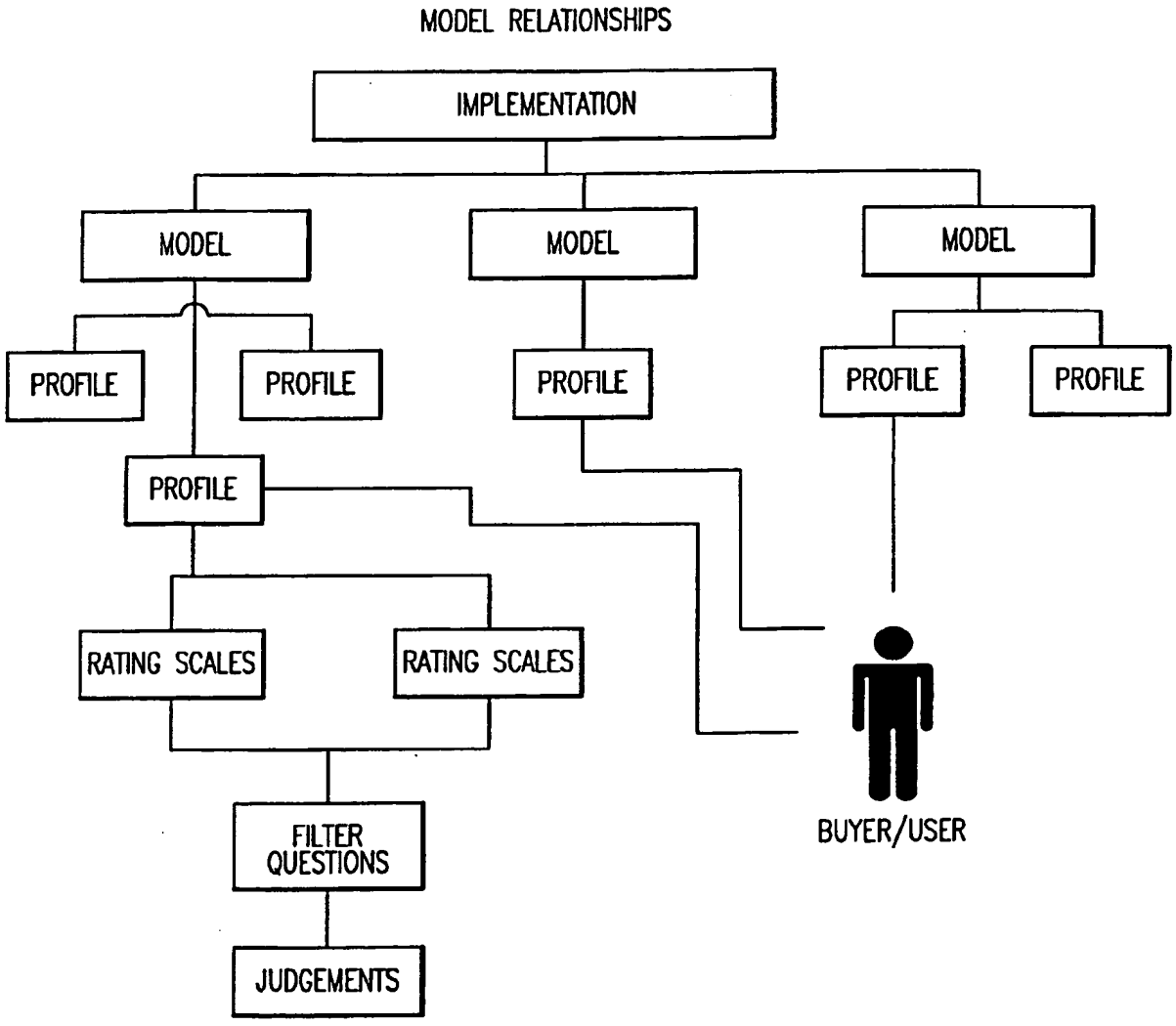

MODEL RELATIONSHIPS
IMPLEMENTATION
MODEL
MODEL
MODEL
PROFILE
PROFILE
PROFILE
PROFILE
PROFILE
PROFILE
RATING SCALES
RATING SCALES
FILTER QUESTIONS
JUDGEMENTS
BUYER/USER

FIG.58

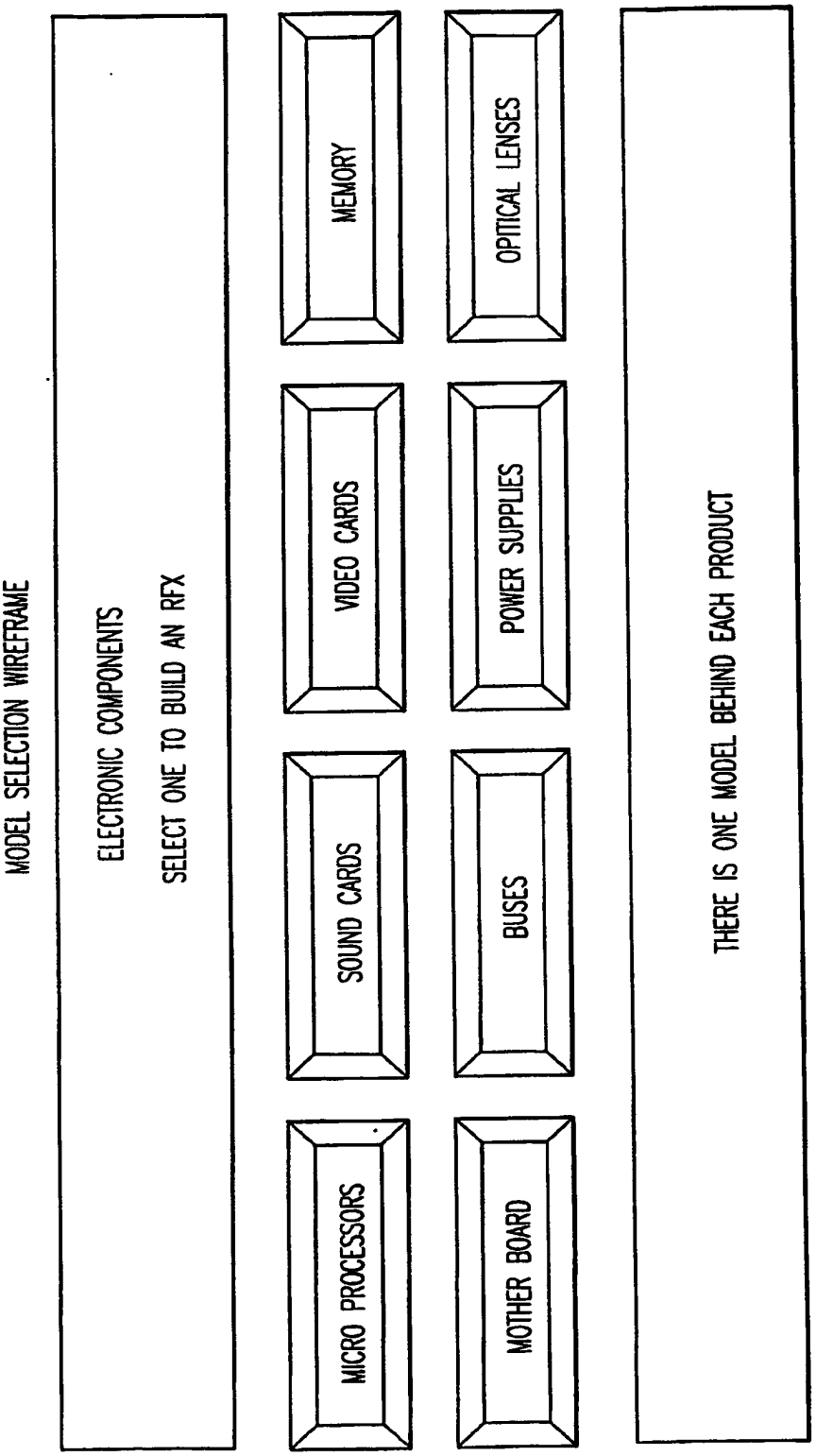

MODEL SELECTION WIREFRAME
ELECTRONIC COMPONENTS
SELECT ONE TO BUILD AN RFX
MEMORY
OPTICAL LENSES
VIDEO CARDS
POWER SUPPLIES
SOUND CARDS
BUSES
MICRO PROCESSORS
MOTHER BOARD
THERE IS ONE MODEL BEHIND EACH PRODUCT

FIG.59

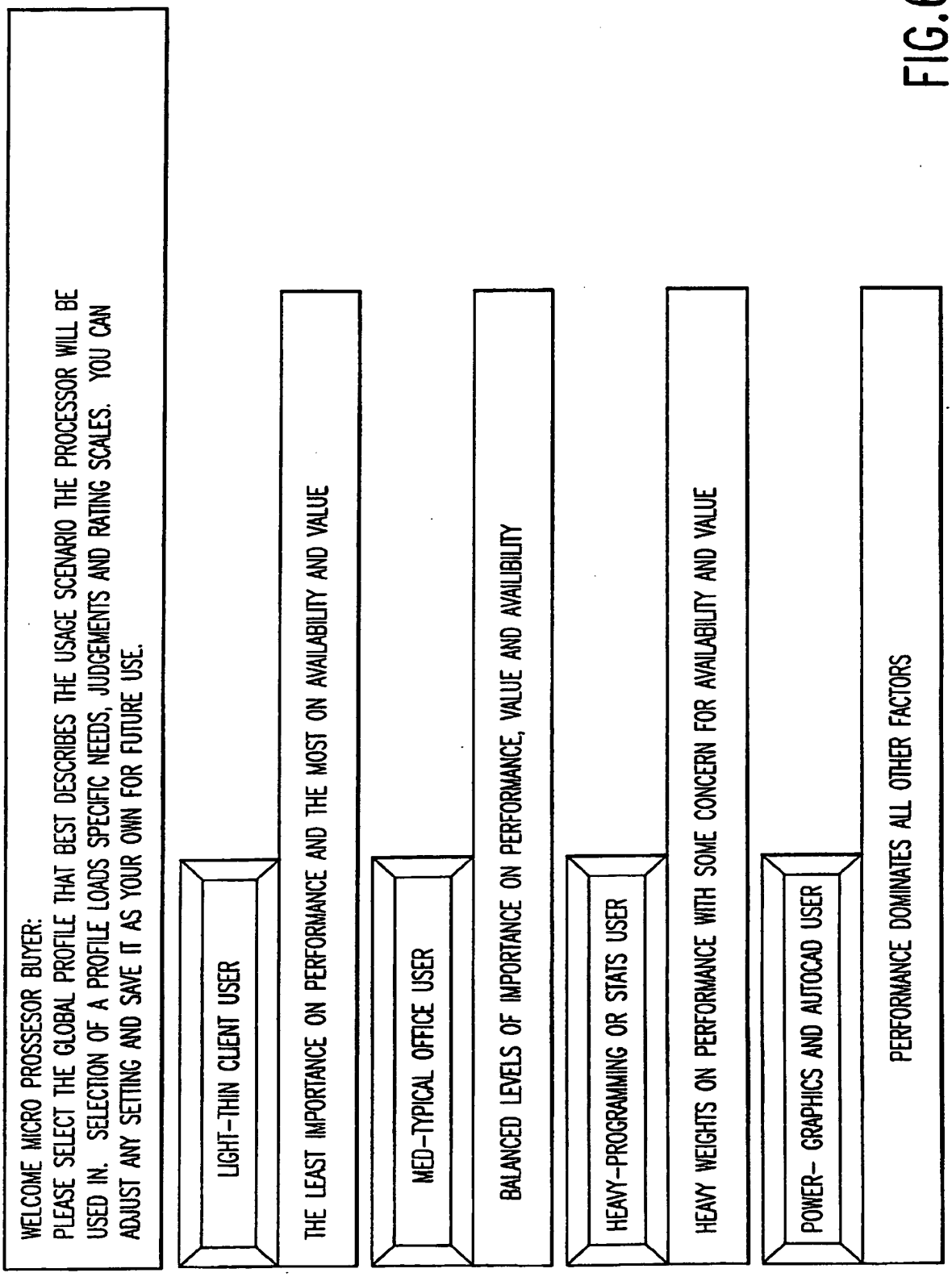

PROFILE SELECTION WIREFRAME
WELCOME MICRO PROSSESOR BUYER:
PLEASE SELECT THE GLOBAL PROFILE THAT BEST DESCRIBES THE USAGE SCENARIO THE PROCESSOR WILL BE USED IN. SELECTION OF A PROFILE LOADS SPECIFIC NEEDS, JUDGEMENTS AND RATING SCALES. YOU CAN ADJUST ANY SETTING AND SAVE IT AS YOUR OWN FOR FUTURE USE.
LIGHT-THIN CLIENT USER
THE LEAST IMPORTANCE ON PERFORMANCE AND THE MOST ON AVAILABILITY AND VALUE
MED-TYPICAL OFFICE USER
BALANCED LEVELS OF IMPORTANCE ON PERFORMANCE, VALUE AND AVAILIBILITY
HEAVY-PROGRAMMING OR STATS USER
HEAVY WEIGHTS ON PERFORMANCE WITH SOME CONCERN FOR AVAILABILITY AND VALUE
POWER- GRAPHICS AND AUTOCAD USER
PERFORMANCE DOMINATES ALL OTHER FACTORS

FIG.60

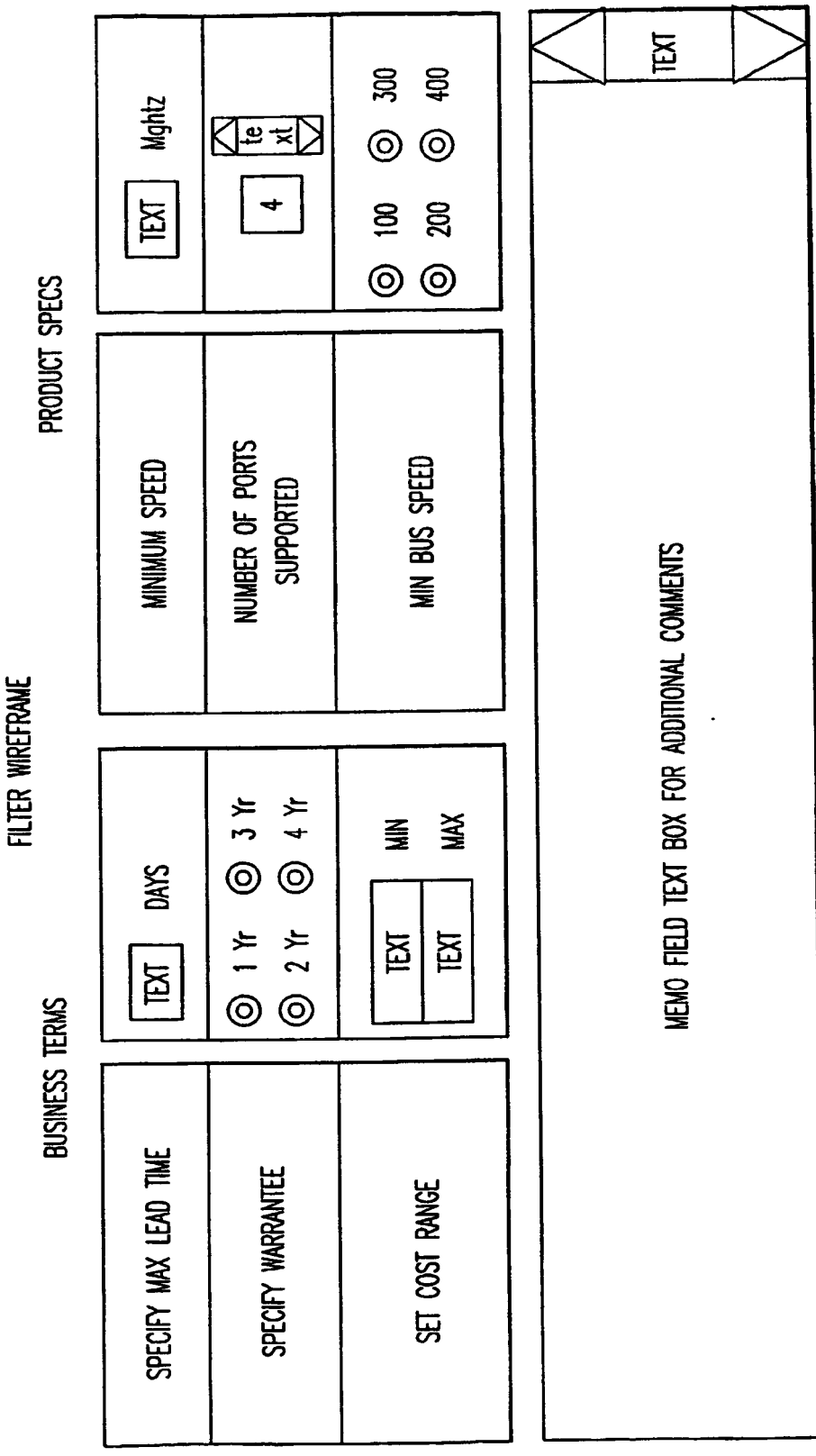

FILTER WIREFRAME
BUSINESS TERMS
PRODUCT SPECS
SPECIFY MAX LEAD TIME
SPECIFY WARRANTEE
SET COST RANGE
TEXT
DAYS
1 Yr
2 Yr
3 Yr
4 Yr
TEXT
TEXT
MIN
MAX
MINIMUM SPEED
NUMBER OF PORTS SUPPORTED
MIN BUS SPEED
TEXT
Mghtz
4
te
xt
100
200
300
400
TEXT
MEMO FIELD TEXT BOX FOR ADDITIONAL COMMENTS

FIG.61

FIG.62

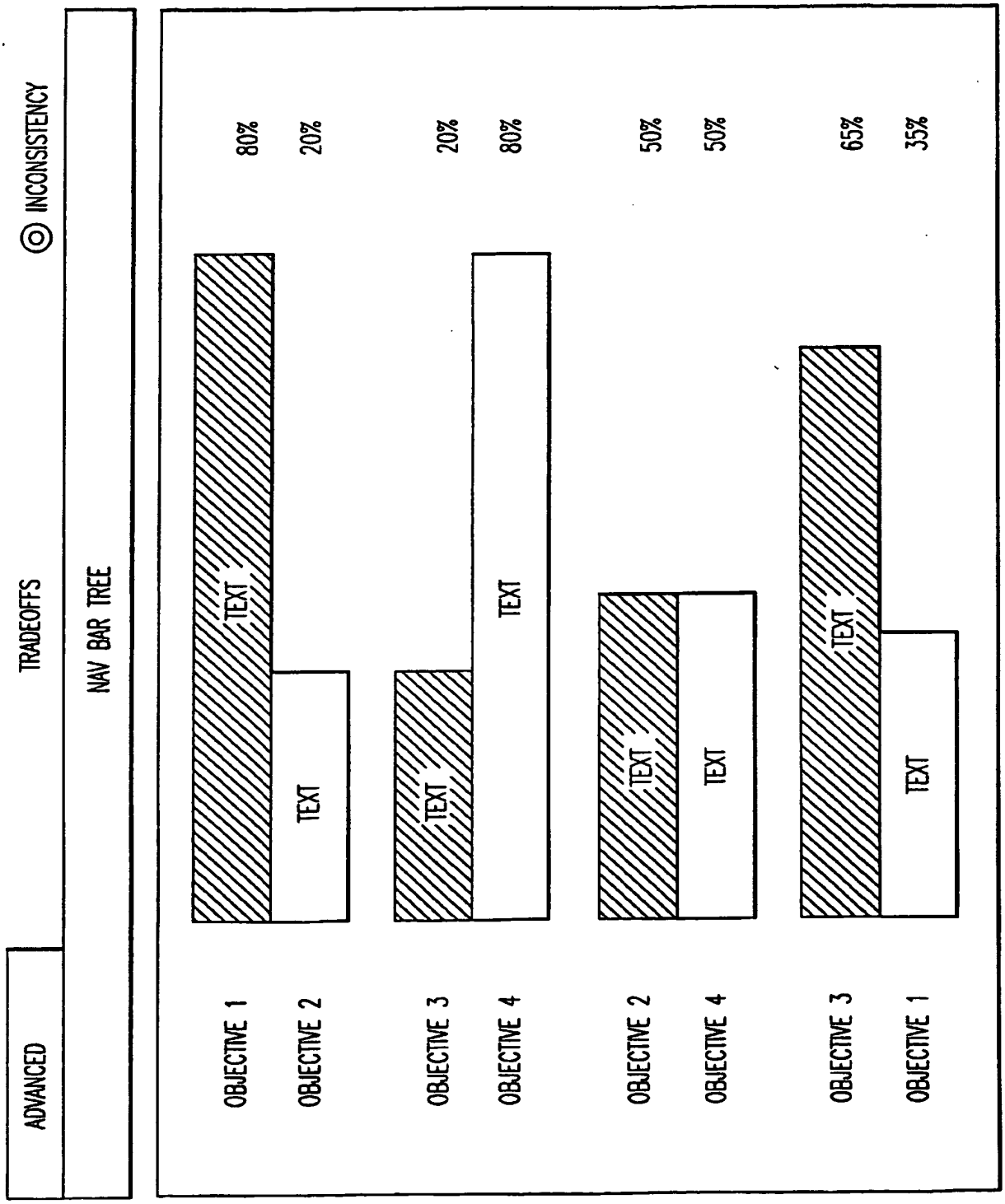
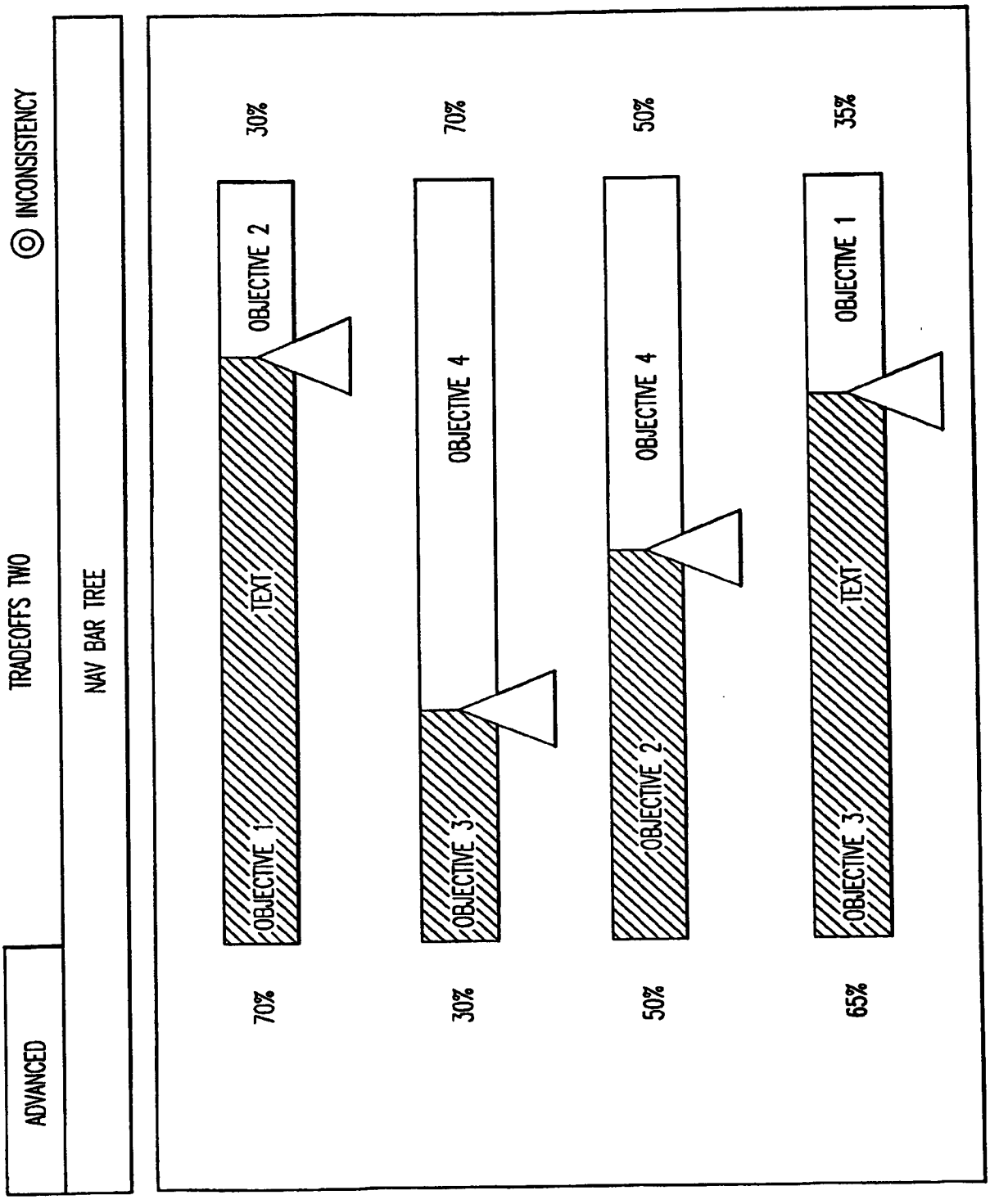

ADVANCED
TRADEOFFS
NAV BAR TREE
INCONSISTENCY
OBJECTIVE 1
OBJECTIVE 2
OBJECTIVE 3
OBJECTIVE 4
OBJECTIVE 2
OBJECTIVE 4
OBJECTIVE 3
OBJECTIVE 1
80%
20%
20%
80%
50%
50%
65%
35%
TEXT
TEXT
TEXT
TEXT
TEXT
TEXT
TEXT
TEXT

FIG.63


ADVANCED
NAV BAR TREE
TRADEOFFS TWO
INCONSISTENCY
70%
OBJECTIVE 1
TEXT
OBJECTIVE 2
30%
30%
OBJECTIVE 3
OBJECTIVE 4
70%
50%
OBJECTIVE 2
OBJECTIVE 4
50%
65%
OBJECTIVE 3
TEXT
OBJECTIVE 1
35%

FULL RESULTS PAGE

PROFILE SELECTED	RFX ID	RFX - OWNER	RFX - CLOSE DATE	NUMBER OF BIDS

EMAIL	UPDATE PROFILE	SAVE RESULTS	DOWNLOAD TO EXCEL	PRINT

JUMP BAR:	SENSITIVITY	H2H	GAP	SIDE X SIDE

CLICK TO SEE NEXT SET OF FIVE. << 1-5 6-10 16-20 21-25 >> VIEW MORE GROUPS

INCLUDE	ALTERNATIVE NAME	SKU	SCORE	TOTAL COST PER UNIT	BENEFIT/ COST RATIO	LEAD TIME	
	SORT	SORT	SORT	SORT	SORT	SORT	
1 ○							SUMMARY / BUY / NEGOTIATE
2 ○							SUMMARY / BUY / NEGOTIATE
3 ○							SUMMARY / BUY / NEGOTIATE
4 ○							SUMMARY / BUY / NEGOTIATE
5 ○							SUMMARY / BUY / NEGOTIATE

FIG.64

SUMMARY REPORT

PROFILE SELECTED	RFX ID	RFX – OWNER	RFX – CLOSE DATE	NUMBER OF BIDS

JUMP BAR:	SENSITIVITY (16)	H2H (17)	GAP (18)	SIDE X SIDE (19)

SUPPLIER NAME AND INFO

THE OBJECTIVES	Obj_1	Obj_2	Obj_n	Obj_n	Obj_n	Obj_n
PRIORITY	.12	$\%_2$	$\%_n$	$\%_n$	$\%_n$	$\%_n$
RAW SCORE	2 DAYS	r_2	r_n	r_n	r_n	r_n
VALUE SCORE	.8654	v_2	v_n	v_n	v_n	v_n

THE OBJECTIVES	Obj_n	Obj_n	Obj_n	Obj_n	Obj_n	Obj_n
PRIORITY	$\%_n$	$\%_n$	$\%_n$	$\%_n$	$\%_n$	$\%_n$
RAW SCORE	r_n	r_n	r_n	r_n	r_n	r_n
VALUE SCORE	v_n	v_n	v_n	v_n	v_n	v_n

MEMO FIELD FOR SUPPLIER RESPONSE text

FIG.65

TRANSACTION REPORT

SUPPLIER NAME AND INFO				
PROFILE SELECTED	RFX ID	RFX – OWNER	RFX – CLOSE DATE	NUMBER OF BIDS

SUMMARY INFO					
ALTERNATIVE NAME	SKU	SCORE	TOTAL COST PER UNIT	BENEFIT / COST RATIO	LEAD TIME
$NAME_1$	SKU_1	$SCORE_1$	$\$_1$	$\%_1$	$DAYS_1$

THE OBJECTIVES	Obj_1	Obj_2	Obj_n	Obj_n	Obj_n	Obj_n
PRIORITY	.12	$\%_2$	$\%_n$	$\%_n$	$\%_n$	$\%_n$
RAW SCORE	2 DAYS	r_2	r_n	r_n	r_n	r_n
VALUE SCORE	.8654	v_2	v_n	v_n	v_n	v_n
THE OBJECTIVES	Obj_n	Obj_n	Obj_n	Obj_n	Obj_n	Obj_n
PRIORITY	$\%_n$	$\%_n$	$\%_n$	$\%_n$	$\%_n$	$\%_n$
RAW SCORE	r_n	r_n	r_n	r_n	r_n	r_n
VALUE SCORE	v_n	v_n	v_n	v_n	v_n	v_n

FILTER INFO		
$NEED\text{–}QUESTION_1$	$NEED_1$	$RESPONSE_1$
$NEED\text{–}QUESTION_n$	$NEED_n$	$RESPONSE_n$
$NEED\text{–}QUESTION_n$	$NEED_n$	$RESPONSE_n$

SUPPLIER MEMO INFO	
TEXT	TEXT

SET PATH FOR SAVE	TEXT
	BROWSE

FIG.66

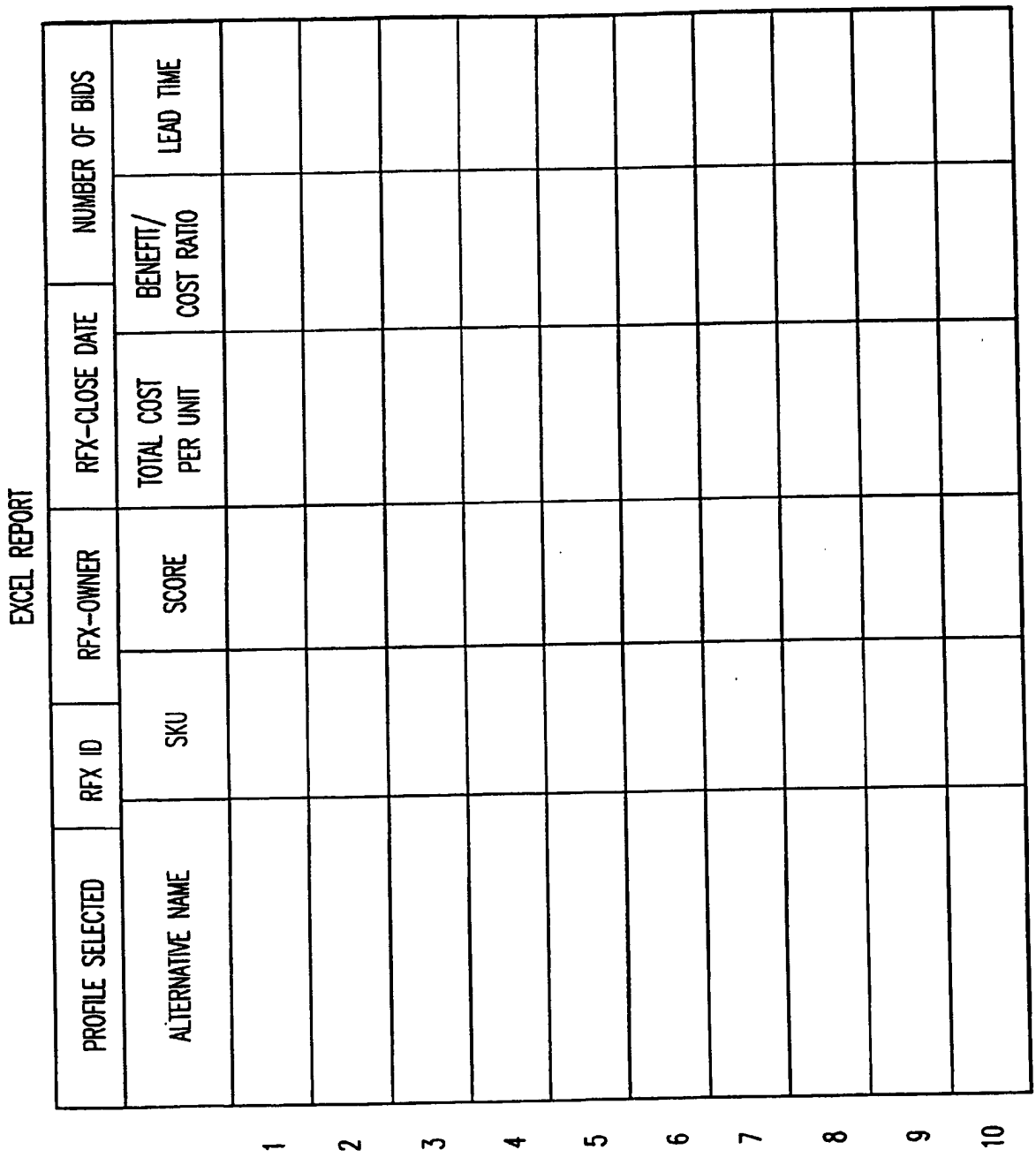

EXCEL REPORT
PROFILE SELECTED
RFX ID
RFX-OWNER
RFX-CLOSE DATE
NUMBER OF BIDS
ALTERNATIVE NAME
SKU
SCORE
TOTAL COST PER UNIT
BENEFIT/ COST RATIO
LEAD TIME
1
2
3
4
5
6
7
8
9
10

FIG.67

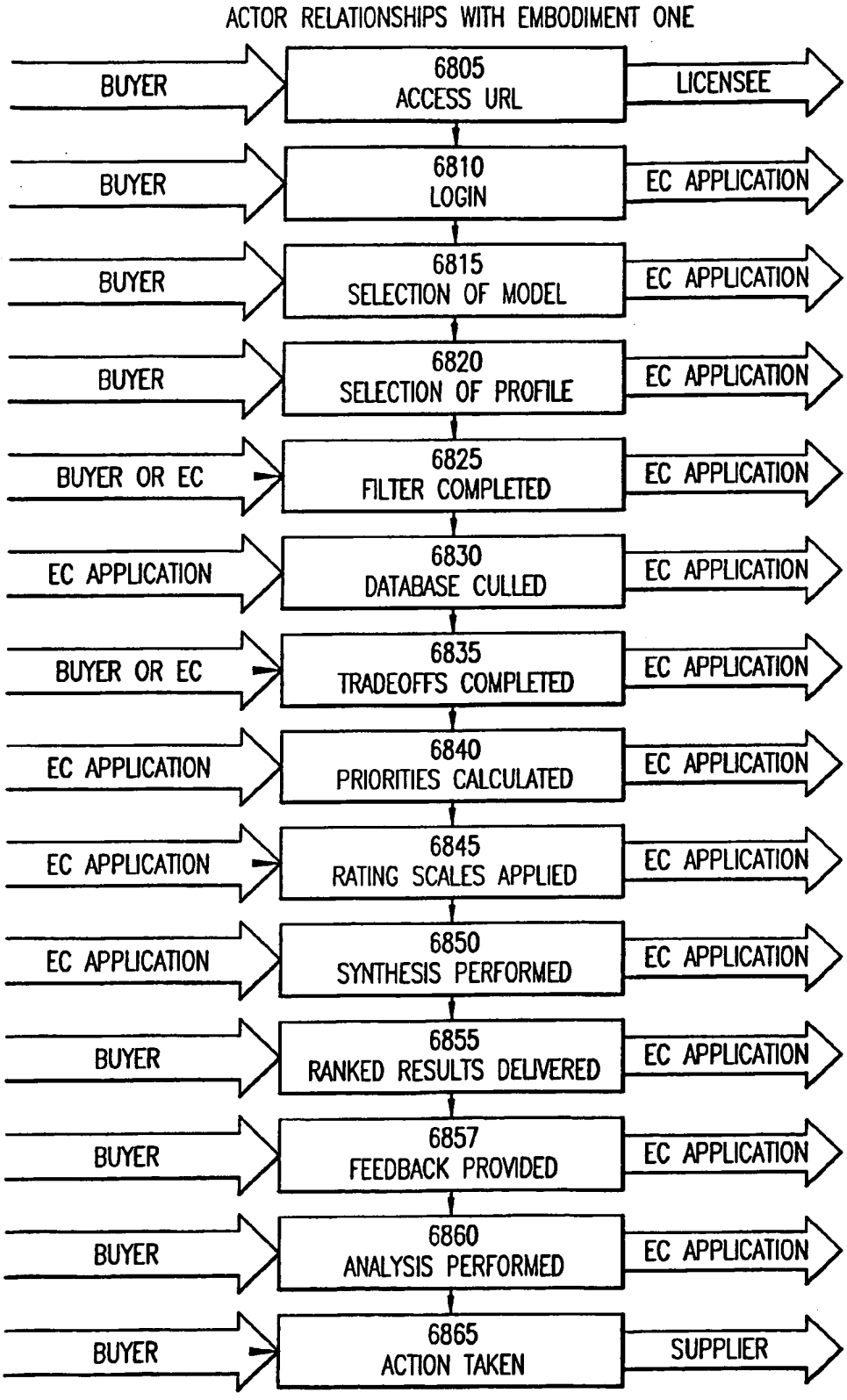

ACTOR RELATIONSHIPS WITH EMBODIMENT ONE
BUYER
6805
ACCESS URL
LICENSEE
BUYER
6810
LOGIN
EC APPLICATION
BUYER
6815
SELECTION OF MODEL
EC APPLICATION
BUYER
6820
SELECTION OF PROFILE
EC APPLICATION
BUYER OR EC
6825
FILTER COMPLETED
EC APPLICATION
EC APPLICATION
6830
DATABASE CULLED
EC APPLICATION
BUYER OR EC
6835
TRADEOFFS COMPLETED
EC APPLICATION
EC APPLICATION
6840
PRIORITIES CALCULATED
EC APPLICATION
EC APPLICATION
6845
RATING SCALES APPLIED
EC APPLICATION
EC APPLICATION
6850
SYNTHESIS PERFORMED
EC APPLICATION
BUYER
6855
RANKED RESULTS DELIVERED
EC APPLICATION
BUYER
6857
FEEDBACK PROVIDED
EC APPLICATION
BUYER
6860
ANALYSIS PERFORMED
EC APPLICATION
BUYER
6865
ACTION TAKEN
SUPPLIER

FIG.68

ACTOR RELATIONSHIPS WITH EMBODIMENT TWO

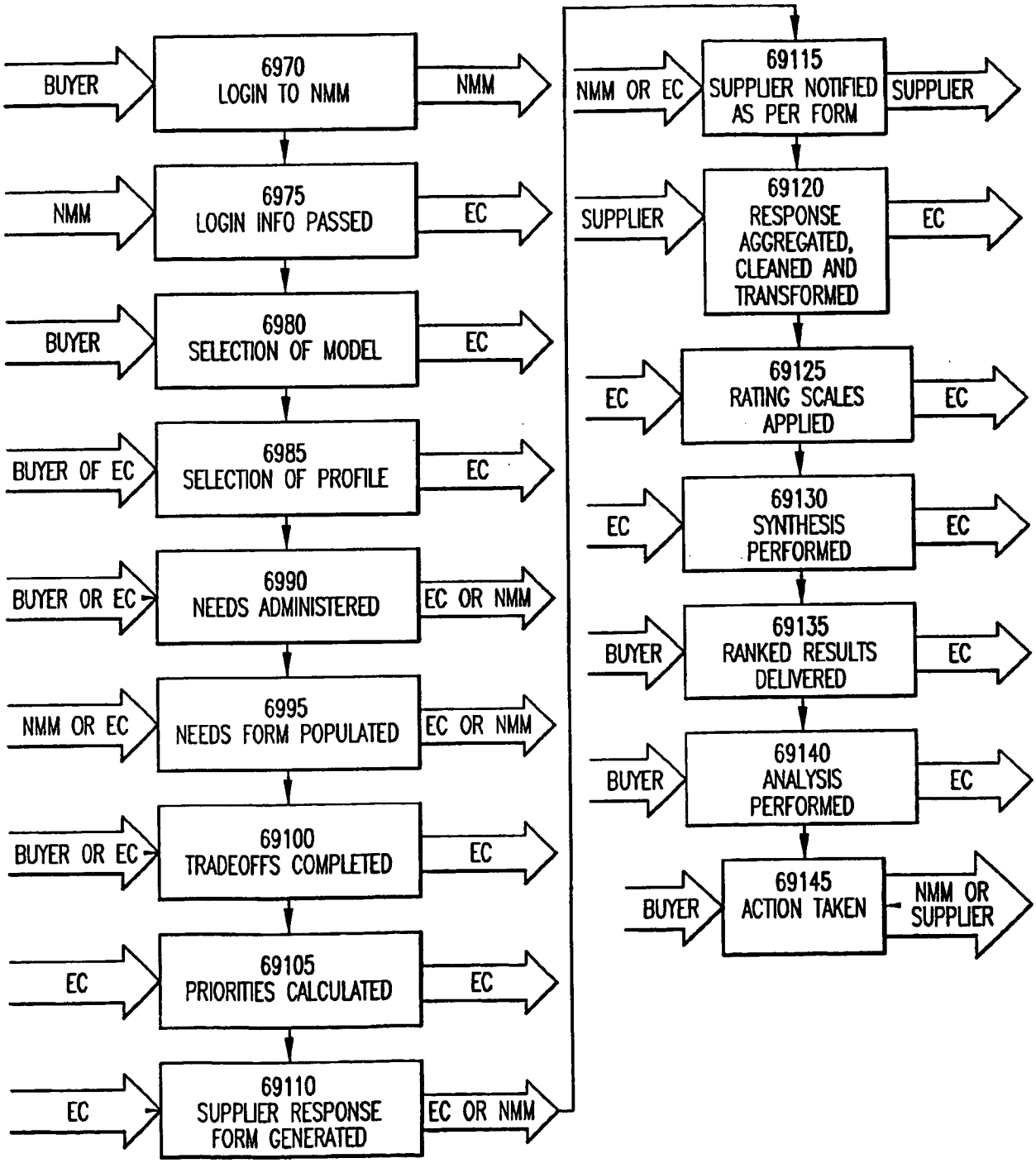


FIG.69

SUPPLIER RESPONSE FORM

PRODUCT NAME	PRODUCT DESCRIPTION

RFX ID	RFX_NAME	RFX-OWNER	RFX-CLOSE DATE	NMM_NAME

FILTER QUESTION 1	NEED LEVEL	SUPPLIER INPUT - TEXT RESPONSE
FILTER QUESTION 2	NEED LEVEL	SUPPLIER INPUT - YES / NO RADIO BUTTON
FILTER QUESTION 3	NEED LEVEL	SUPPLIER INPUT - ONE CHOSE PULL DOWN
FILTER QUESTION 4	NEED LEVEL	SUPPLIER INPUT - MULTI CHOICE PULL DOWN
FILTER QUESTION n	NEED LEVEL	SUPPLIER INPUT - MULTI CHOICE CHECK BOX

Obj-1	Obj-n	Obj-n	Obj-n	Obj-n	Obj-n	Obj-n
%	%	%	%	%	%	%

Obj-1: EXPLANATION OF EVALUATION CITERIA:	SUPPLIER INPUT
Obj-n: EXPLANATION OF EVALUATION CITERIA:	SUPPLIER INPUT
Obj-n: EXPLANATION OF EVALUATION CITERIA:	SUPPLIER INPUT
Obj-n: EXPLANATION OF EVALUATION CITERIA:	SUPPLIER INPUT

MEMO FIELD TEXT BOX FOR ADDTIONAL COMMENTS

TEXT

FIG.70

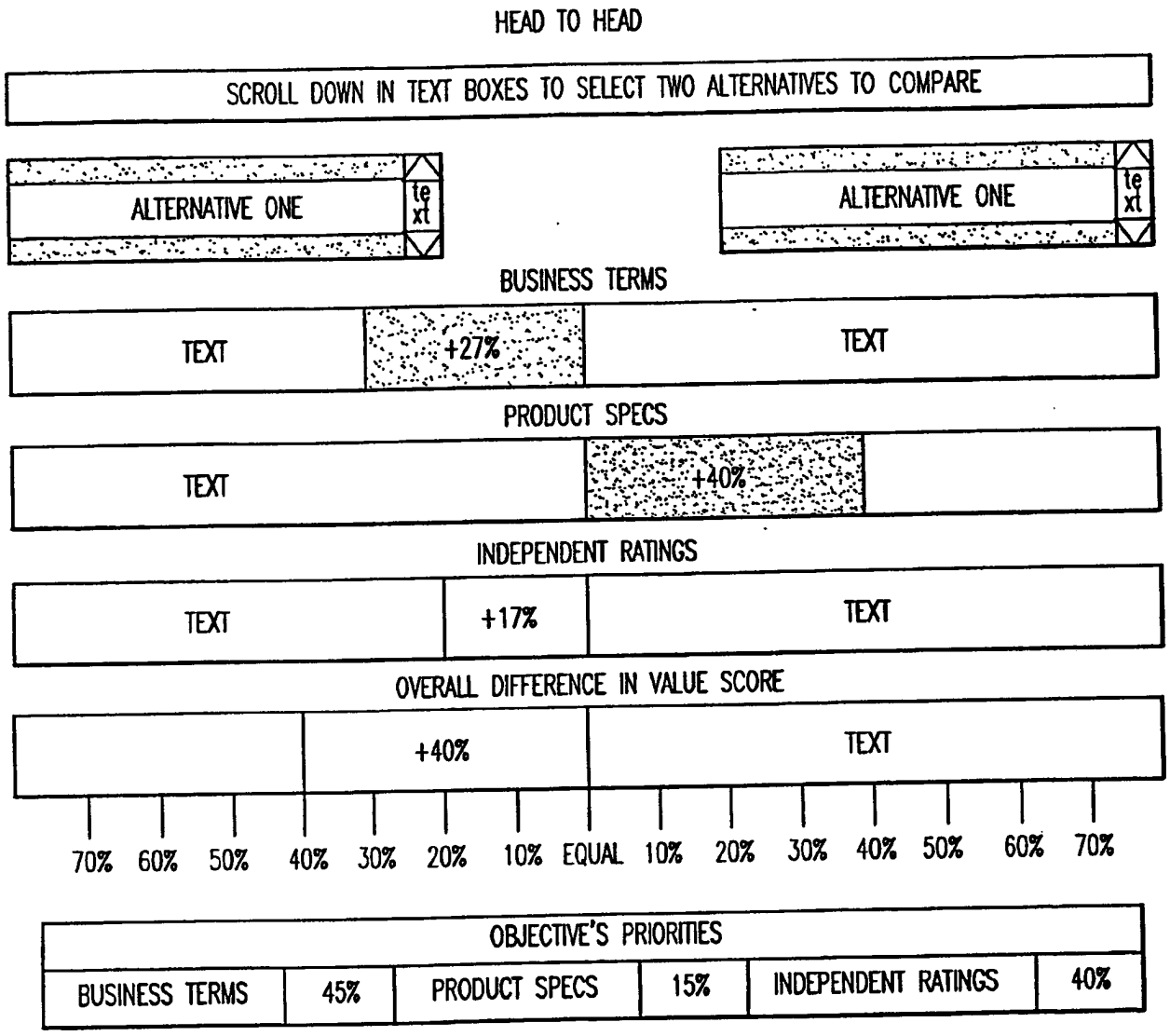

HEAD TO HEAD
SCROLL DOWN IN TEXT BOXES TO SELECT TWO ALTERNATIVES TO COMPARE
ALTERNATIVE ONE
text
ALTERNATIVE ONE
text
BUSINESS TERMS
TEXT
+27%
TEXT
PRODUCT SPECS
TEXT
+40%
INDEPENDENT RATINGS
TEXT
+17%
TEXT
OVERALL DIFFERENCE IN VALUE SCORE
+40%
TEXT
70% 60% 50% 40% 30% 20% 10% EQUAL 10% 20% 30% 40% 50% 60% 70%
OBJECTIVE'S PRIORITIES
BUSINESS TERMS
45%
PRODUCT SPECS
15%
INDEPENDENT RATINGS
40%

FIG.71

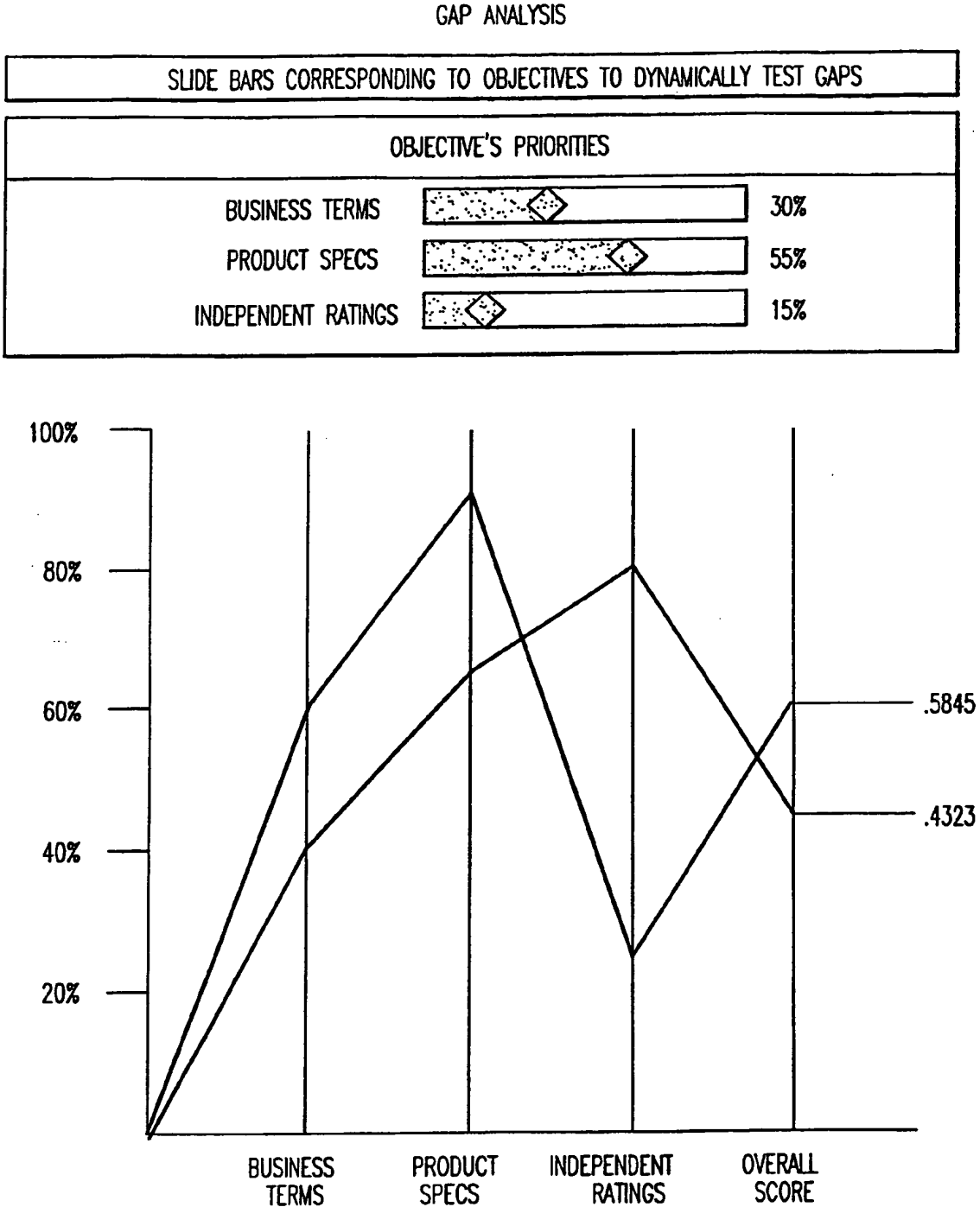

GAP ANALYSIS
SLIDE BARS CORRESPONDING TO OBJECTIVES TO DYNAMICALLY TEST GAPS
OBJECTIVE'S PRIORITIES
BUSINESS TERMS
30%
PRODUCT SPECS
55%
INDEPENDENT RATINGS
15%
100%
80%
60%
40%
20%
.5845
.4323
BUSINESS TERMS
PRODUCT SPECS
INDEPENDENT RATINGS
OVERALL SCORE

FIG.72

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/25506

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) :G06F 17/60
US CL :705/27
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/27, 26, 1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Please See Extra Sheet.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	HERMAN et al., A Monte Carlo study of pairwise comparison, Elsevier Science B.V., Information Processing Letters 57 (1996), pp.25-29.	1-115
Y	CHANG et al., Customizable multi-engine search tool with clustering, Elsevier Science B.V., Computer Networks and ISDN Systems 29 (1997) pp. 1217-1223.	1-115
Y	JONSSON et al., Interaction of query evaluation and buffer management for information retrieval, SIGMOD 98, vol.27, issue 2, June 1998, pp.118-129.	1-115

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 26 NOVEMBER 2000	Date of mailing of the international search report 22 DEC 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer CUONG H. NGUYEN James R. Matthews Telephone No. (703) 305-4553

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/25506

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	TAIRA et al., A method of constructing pairwise comparison matrix in decision making, 1996 IEEE International Conference on Systems, Man, and Cybernetics, vol.4 of 4, October 14-17, 1996, pp.2511-2516.	1-115
Y	SANCHEZ et al., Information concepts and pairwise comparison matrices, Elsevier Sciences B.V., Information Processing Letters 68 (1998) pp.185-188.	1-115
Y	CHANG et al., Enabling concept-based relevance feedback for information retrieval on the WWW, 1999 IEEE Transactions on knowledge and data engineering, vol.11, no.4, July/August 1999, pp.595-609.	1-115
Y	VOIGT, SKIPPER: A tool that lets browsers adapt to changes in document relevance to its user, 1996 IEEE 6th International workshop on Research issues in Data Engineering, pp.61-68.	1-115
Y	ERIKSSON et al., SICS MarketSpace - an agent-based market infrastructure, Agent Mediated Electronic Commerce, May 10 1998, pp.41-53.	1-115
Y	THOMAS L. SAATY, A scaling method for priorities in hierarchical structure, J. Math Psychology, vol.15, no.3, June 1977, pp.234-281.	1-115
Y	HARKER, The theory of ratio scale estimation: Saaty's analytic hierarchy process, Management Science, Vol.33, No.14, Nov. 1987, pp. 1383-1403.	1-115
Y	THOMAS L. SAATY, The analytic hierarchy process, McGraw-Hill, 1980.	1-115
Y	PATRICK T. HARKER, "Alternative Modes of Questioning in the Analytic Hierarchy Process, Math Modeling, vol.9, no.3-5, 1987, pp.353-360.	1-115
Y	FORMAN et al., Team expert choice advanced group decision support software user manual, Introduction to Modelling, pp.353-394, 1998.	1-115
Y,P	THOMAS L. SAATY, Fundamentals of decision making and priority theory with the analytic hierarchy process, vol.6 of the AHP series, pp.224-335, 2000 (first edition 1994).	1-115

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/25506

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	THOMAS L. SAATY, Decision making for leaders, The Analytic Hierarchy Process for Decision in a Complex World, pp.14-36, and 119-151, 1999-2000.	1-115

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/25506

B. FIELDS SEARCHED
Documentation other than minimum documentation that are included in the fields searched:

Microsoft Press, Computer Dictionary, 3rd edition, 1997.
Cosidine, Van Nostrand's Scientific Encyclopedia, 6th edition, 1983.
WEBSTER'S II, New Riverside University Dictionary, 1988

B. FIELDS SEARCHED
Electronic data bases consulted (Name of data base and where practicable terms used):

WEST2.0/DERWENT, DIALOG, Proquest
search terms: rating, Internet, hierarchy, select, product, service, convert, weight, priority, comparison, 705/26,27.ccls., network, server, assist, user, evaluate, access, profile, creation, characteristic, filter, decision, relative importance, record, data, ranking.

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